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HYDATID DISEASE OF THE LIVER.[1]

By K. DOUGLAS FAIRLEY, M.D.,

From the Walter and Eliza Hall Institute of Research, Melbourne.

IN thirteen years (1908-1921) two hundred and fifty-eight patients in whom the diagnosis of hydatid disease was confirmed by the surgeon or the pathologist, were admitted to the wards of the Melbourne Hospital. In 72.9% cysts were present in the liver, figures which agree closely with those of Dévé[1] who found hepatic cysts in 74.9% of 2,727 patients with echinococcal infestation. The present study is based on an analysis of the case records of one hundred and sixty-seven adult patients.

The age and sex incidence and the mortality is shown in Table I. It is seen that the death rate rises considerably after middle age.

Pathology.

The Path of Infestation.

The parasite usually reaches the liver after piercing the wall of the stomach and entering the blood vessels of the portal circulation. The cyst is most frequently found in the right lobe of the liver probably because the right branch of the portal vein is larger and pursues a more direct course than the left.

The Mode of Growth of the Parasite.

In the lower animals exogenous budding is the rule, while in man daughter cyst formation as a result of endogenous proliferation is frequently found. Dévé[2] considers that the normal cyst contains no daughter cysts, the appearance of these indicating that the parasite has undergone some change. Exogenous budding is commonly found in man in the cysts of bone or in muscle, rarely in other situations.

Multiple Infestation.

There was definite evidence of the presence of multiple cysts (either in the liver or elsewhere) in 42% of these patients. In some of these the multiple sowing of the cysts may have been secondary to rupture of the cyst at operation or by non-surgical trauma. In the majority, the infestation was primarily multiple. This is necessarily a low estimate as complete examination is only possible *post mortem*. In 68% of those so examined multiple cysts were found. Of the patients 22.9% have undergone more than one operation for the removal of the cysts, one patient having been operated on eleven times in fifteen years.

[1] Received for publication on August 6, 1923.

TABLE I.

THE AGE AND SEX INCIDENCE.

Age.	Sex.		Total.	Deaths.
	Male.	Female.		
Years.				
15-20	7	8	15	—
21-30	24	21	45	3= 6.7%
31-40	12	23	35	3= 8.6%
41-50	24	14	38	10=26.3%
51-60	15	4	19	6=31.6%
61-70	4	7	11	5=45.5%
71-80	2	1	3	—
81-90	1	—	1	—
Total	89	78	167	27=16.2%

The frequency of multiple infestation in man is usually under-estimated; in animals it is almost invariable.

The Condition of the Cyst.

The condition of the cyst is correlated with the results of operative interference in Table II.

It is seen that in operation lies the only hope of relief. The two patients who survived long enough without operation to leave hospital, were both very sick old men who probably succumbed in a short time.

The high incidence of complications is worthy of note. Practically 50% of the patients sought advice only when the supervention of some complication directed attention to the condition. The usual complications of hydatid cysts in any situation are degeneration, suppuration and rupture.

Degeneration of the parasite is common. It was observed in 14.4% of the patients. It causes no particular alteration in the clinical picture of the disease.

Suppuration, the most frequent complication (32.9%), is usually secondary to a transient bacteriæmia, though infection may occur by way of the bile ducts. It often follows more or less slight trauma. It may be a focus for further injury, such as pyæmia or ulcerative endocarditis (see history of Case 48). The suppurative process usually begins as a pericystitis (Dupré). In hepatic cysts the bacteria generally come from the intestinal canal, the most common organism being of the coliform type, while streptococci and staphylococci are often present. Secondary infection with the bacterial flora of the respiratory tract may follow rupture of a cyst into the lung. Occasionally the pus is apparently sterile. In chronic cases the organisms may die out as time goes on, just as do the gonococci in tubal infections. Anaerobic bacteria may be present in some of these cysts or the suppuration may be due to the action of chemical agents, such as the entry of bile into the cyst or the disintegrative products of the dead or dying parasite.

Often with suppurating cysts the usual general manifestations of sepsis (fever, rigors, sweats, leucocytosis) are absent, probably because the thick adventitia prevents the rapid absorption of toxic products.

Rupture of the cyst occurs most frequently when suppuration is already present. The results of this accident are considered when the symptomatology of hepatic hydatid disease is being discussed.

The Cause of Death in Hydatid Disease of the Liver.

The fatalities following operation on uncomplicated cysts were due to heart failure, cirrhosis of the liver with hepatic insufficiency, pulmonary embolism and post-operative infection (empyema). In no case was necropsy permitted. Of the patients with degenerated cysts, one died from pulmonary embolism following femoral thrombosis, while in the other the cyst was discovered *post mortem*, the cause of death being uræmia.

In three of the patients with suppurating cysts associated disease (tuberculosis or cirrhosis of the liver) helped to turn the scale against the patient, while pyæmia was responsible for the fatal issue in another instance. Four of the six patients not subjected to operation died from simple toxæmia, while ulcerative endocarditis in one and cholangitis with broncho-pneumonia in the other were fatal complications. Only one of eight patients in whom rupture of a suppurating cyst caused general peritonitis, recovered, the resulting toxæmia causing death in the others.

Broncho-pneumonia and ascites hastened the fatal issue in the patient in whom the condition of the cyst was not recorded.

TABLE II.

THE CONDITION OF THE CYSTS AND THE RESULTS OF TREATMENT.

Method of Treatment.	Uncomplicated.	Complicated.	Degenerated.	Suppurating.	Ruptured Suppurating.	Ruptured Non-Suppurating.	No Record.	Total.
Operation	81(6[2])	71(10)	23(1)	41(5)	5(4)	2	3(1)	155(17)
No operation	1	10(10[1])	1(1)	6(6)	3(3)	0	1	12(10)
Total	82	81	24	47	8	2	4	167

[1] In one of these patients a degenerated cyst was discovered *post mortem*, the cause of death being uræmia.

[2] In one of these cases the patient was so seriously ill that the operation had to be abandoned before the cyst had been dealt with.

The figures in parentheses indicate the number of deaths in each group.

Several of these patients were obviously in a serious condition before operation. Otherwise the deaths in the series were due to the accidents of operations—infection, pulmonary embolism and heart failure.

Associated Diseases.

Gall stones were removed from three patients, while cholecystitis was also rarely found. Tuberculosis, syphilis and chronic pulmonary, cardiac and kidney disease were present in a certain proportion of cases.

Dévé[3] holds that sometimes cirrhosis of the liver of toxic origin occurs as a result of prolonged retention of bile from compression of bile ducts by a hydatid cyst. Cirrhosis of the liver was occasionally noted in this series.

Symptomatology of Hepatic Hydatid.

The onset of the disease is insidious. The fact that about 50% of the patients first sought advice only after the advent of some complication in the cyst illustrates the tendency of the disease to remain latent. Table III. includes many cases where the parasite remained latent or caused such mild symptoms that though they persisted for months or years, there was no apparent need to seek medical advice until the sudden onset of severe symptoms altered the aspect of the case.

In many patients with uncomplicated cysts the mild symptoms persist unaltered for years, while in others there is a gradual increase in the severity of the symptoms until finally the patient seeks advice. With the onset of complications in the cyst, especially suppuration and rupture, and frequently in apparently uncomplicated cases there is a rapid or sudden increase in the severity of the symptoms.

Pain.

It is usually taught that hydatid disease of the liver is not a painful affection. MacLaurin[4] has emphasized the fact that adults constantly complain of pain, often of a severe character. In this series of adult patients pain has been the most prominent feature of the majority of the histories (see Table IV.).

Of seventy-seven patients with uncomplicated cysts, pain was the initial symptom in fifty-one (66.2%). Frequently this pain led to the discovery of the tumour, though in fifteen cases the swelling was the first abnormality noted by the patient. Other infrequent initial symptoms were indigestion, jaundice, ascites, cough, dyspnœa, weakness and wasting.

With the onset of complications pain becomes a still more prominent symptom. In 86.4% of the patients with degenerated cysts and in 84.1% of those with suppurating cysts pain was the first symptom, while tumour, indigestion, jaundice and cough were occasionally the earliest manifestations of the presence of the parasite. In five of the seven patients with ruptured suppurating cysts pain was the initial symptom, while in the two with non-suppurating ruptured cysts, the disease had been latent until the rupture occurred with the sudden onset of abdominal pain and collapse. Thus in 75% of one hundred and fifty-two patients with hydatid disease of the liver pain was the first symptom.

When pain is present, it is usually the symptom which above all others brings the patient to the physician. In about 80% of the uncomplicated cases and in 96% of those in whom complications had supervened, the patient sought advice on account of pain, while in only about 10% of uncomplicated cases was the doctor consulted because of the presence of a tumour.

The type of pain is variable, being described as severe, dull, aching, shooting, stabbing and so on. It is often worse on exertion or change of posture. In a certain number of cases (twenty-eight in this series) the pain simulates that of biliary colic and the diagnosis of gall stones is frequently made. This seems more prone to occur when complications are present. Often the pain is of the pleuritic type (twenty-two cases), made worse by deep breathing or coughing, so that pleurisy is sometimes considered a complete diagnosis. Ten patients in this series (6.4%) had been treated for pleurisy a few months before admission to hospital with hydatid disease of the liver. It was shown in a previous paper[5] that 54.5% of patients with hydatid cysts of the lung gave a history either of previous pleurisy from which many of them dated their symptoms, or of pain of the pleuritic type for a variable period. In any patient, therefore, who has persistent pain of the pleuritic type, the possible presence of hydatid disease of the liver or lung should be considered.

The situation of the pain is almost invariably in the upper part of the abdomen or the lower part of the chest. Frequently it radiates through to the

TABLE III.

THE DURATION OF SYMPTOMS BEFORE MEDICAL ADVICE WAS SOUGHT.

Condition of the Cyst.	Number of Cases.	Duration of Symptoms.		Duration of Increased Severity of Symptoms.	
		Average.	Extremes.	Average.	Extremes.
Uncomplicated	82	18 months	A few hours to 11 years	7 months	A few hours to 9 years
Degenerated	24	18 months	A few hours to 8 years	2 to 3 weeks	A few hours to 4 months
Suppurating	44	18 months	A few hours to 20 years	2 to 3 weeks	A few hours to 3 months
Ruptured suppurating	8	4 months	A few hours to 1.5 years	1 week	A few hours to 1 month
Ruptured non-suppurating	2	—	Latent	—	A few hours

TABLE IV.

THE SYMPTOMS OF HYDATID DISEASE OF THE LIVER.

Condition of the Cyst.	No. of Patients.	Symptoms.								
		Pain.	Indigestion.	Nausea or Vomiting.	Diarrhœa.	Dyspnœa.	Fever.	Shivers.	Sweats	Weakness and Wasting.
Uncomplicated	82	65	24	25	3	5	7	3	3	11
Complicated	75	72	22	50	5	5	30	23	17	25
Degenerated	22	21	5	15	2	0	5	6	4	6
Suppurating	44	42	14	26	0	3	23	14	11	16
Ruptured, suppurating	7	7	3	7	2	2	2	3	2	3
Ruptured, non-suppurating ..	2	2	0	2	1	0	0	0	0	0

back or up to the shoulder. The pain is rarely referred to the lower segment of the abdomen, except in the case of rupture of the cyst into the peritoneal cavity.

Various factors probably contribute to the production of pain in hepatic hydatid, pressure on the minute bile ducts or rupture into the ducts, diaphragmatic pleurisy, subphrenic peritonitis and hepatoptosis with kinking of the common bile duct all probably being responsible in different cases. MacLaurin[4] emphasizes the importance of hepatoptosis in the production of many of the symptoms of hydatid disease of the liver.

In Table IV. the various symptoms commonly met with in hepatic hydatid disease are tabulated.

Other Symptoms.

Digestive disturbances are present more frequently than any other symptom except pain, though usually they are not a prominent feature of the history. Nausea, vomiting, a feeling of fullness or discomfort or sometimes even definite pain after meals and flatulence are the usual complaints.

Nausea and vomiting were more frequent when complications were present. The vomiting in about 60% of cases was definitely associated with pain. In others it occurred after meals or independently of taking food. In 15% of those who complained of vomiting, it was only a very occasional occurrence.

The other symptoms of digestive disturbance are grouped in Table IV. under the heading "indigestion." They were present with equal frequency in patients with complicated and uncomplicated cysts.

Diarrhœa was occasionally noted, particularly when rupture of the cyst had occurred with or without peritonitis.

Dyspnœa (6.4%) may be due to pressure of the cyst on the thoracic viscera compressing the lung and dislocating the heart, while sometimes it results from an associated pleural effusion.

Cough is seldom present in uncomplicated cysts of the liver. In the majority of cases in this series in which cough was noticeable, some associated pulmonary disease, tuberculosis, hydatid of the lung or pleural effusion, was present. On the other hand cough is invariably present at some stage in pulmonary hydatid disease.

General symptoms of toxæmia, fever, shivers, sweats and wasting are present in a considerable proportion of patients with complicated cysts. In the absence of complications these symptoms are almost invariably associated with attacks of pain indistinguishable from biliary colic. The loss of weight in patients with uncomplicated cysts is usually slight.

It is seen from Table IV. that these symptoms are found most frequently when the cyst is sup-

TABLE V.

THE SIGNS OF HYDATID DISEASE OF THE LIVER.

Condition of the Cyst.	Number of Patients.	Signs.										
		Hepatomegaly.	Tumour.	Tenderness.	Rigidity.	Signs at Bases of Lungs.	Displacement of Heart.	Bulging of Chest Wall.	Dilated Veins on Chest and Abdomen.	Jaundice.	Ascites.	Œdema of Legs.
Uncomplicated	82	48	62	13	7	27	4	17	2	17	3	2
Complicated	75	38	34	40	30	29	2	4	0	36	1	3
Degenerated	22	10	13	9	5	5	0	1	0	10	0	0
Suppurating	44	26	19	22	17	19	2	2	0	23	1	2
Ruptured, suppurating	7	2	2	7	7	5	0	1	0	3	0	1
Ruptured, non-suppurating	2	0	0	2	1	0	0	0	0	0	0	0

purating. But in nearly 50% of patients with suppurating cysts fever was absent before operation. Many were operated on soon after admission, so that the pre-operative temperature record was of short duration. However, it is well known that in many cases of suppurating hydatid cysts none of the usual manifestations of sepsis are present, probably on account of slow absorption through the thickened adventitia. Such symptoms in a patient with hydatid disease of the liver rather suggest the presence of suppuration, though their absence by no means excludes suppuration in the cyst.

The Signs of Hepatic Hydatid.

The relative frequency of the various signs found on examination of a patient with hydatid disease of the liver is shown in Table V.

Tumour.

The most frequent sign of hepatic hydatid disease is the presence of the characteristic tumour. It is found more often in patients with uncomplicated cysts because these are associated much less commonly with abdominal tenderness and rigidity which tend to mask the tumour. Frequently the cyst may be seen as a definite bulging in the upper portion of the abdomen. It moves freely with respiration and on palpation is smooth, sometimes lobulated, round, firm and elastic. It is absolutely dull to percussion, the dulness being continuous with the liver dulness and very rarely does it give the typical hydatid thrill. Barnett[6] has pointed out that cysts giving this pathognomonic thrill are usually superficially situated and contain daughter cysts not closely packed having room to vibrate in contact with the parent cyst wall, while the tension in the cyst is somewhat lower than normal.

The rate of growth of the swelling varies. Uncomplicated cysts generally increase slowly in size over a long period. In one patient the tumour had been observed for twenty years and had increased so slowly that there had been practically no inconvenience until the onset of suppuration.

Hepatomegaly.

Hepatomegaly is frequently associated with hydatid disease. Enlargement downwards is detected about three times more commonly than upward enlargement of the liver. Enormous hypertrophy may occur to compensate for the destruction of liver tissue by the parasite. Mistakes are often made in the localization of the cyst, because the increase in size of one lobe is attributed to the presence of a cyst in that lobe, whereas it is really due to an hypertrophy compensating for a cyst in the other lobe. Occasionally an hypertrophied left lobe of the liver may reach the size of the right lobe, but the destruction of liver tissue is generally limited and the resultant compensatory increase in size is slight. Another error in localization of the parasite arises from mistaking the lobe of the liver pushed down by a cyst on the upper surface for the cyst itself.

Abdominal tenderness and rigidity are found in uncomplicated cases usually only when there has been a preceding attack of pain simulating biliary colic. Such patients may show a clinical picture identical with that of gall stones. Otherwise these signs are definitely suggestive of the presence of some complication in the cyst, usually suppuration or rupture.

Signs Due to Pressure.

The other signs present in hydatid disease of the liver are usually due to the pressure exerted on neighbouring structures by the cyst in its slow development. The most important are those found so frequently at the base of the right lung. The hepatic cyst often causes an elevation of the diaphragm with resultant pressure collapse of the lung tissue, while the immobility or diminished movement of the diaphragm leads to the gradual absorption of the air in the alveoli and collapse of the lung follows. Secondary infection from the bronchial tree may then lead to broncho-pneumonic manifestations. Rarely these may be the first indication of the disease.

The usual signs found at the base of the lung are dulness and diminished or absent breath sounds. Moist sounds are seldom present. Frequently the signs resemble those of pleural effusion. In 4.2% of the patients fluid was proved to be present in the pleural cavity, usually as pus in the case of suppurating cysts. This does not necessarily indicate rupture of the cyst. Less often auscultation reveals the presence of a friction rub usually low in the axilla or posteriorly and very occasionally in the upper part of the abdomen over the liver when it is due to an associated localized peritonitis.

Displacement of the heart was rarely noted. It occurs with some cysts in the upper portion of the liver and, of course, where there is an associated pleural effusion.

Bulging of the chest wall in the region of the tumour was observed in a fair proportion of the patients with uncomplicated cysts. Where the bulging is not obvious, it may be detected occasionally by careful measurement. Though not pathognomonic of hydatid disease this sign is very suggestive of the presence of the parasite.

Dilatation of the superficial veins of the thoracic and abdominal walls was rarely seen. As Graham[7] pointed out many years ago hydatid cysts so seldom cause pressure on the large blood vessels that the presence of dilated veins in the abdominal wall is rather strong evidence against the diagnosis of this disease.

Ascites and œdema of the legs are also seldom seen. They may be due to pressure of the cyst on the portal vein and the inferior *vena cava*.

Jaundice was present in about 50% of patients with complicated cysts, while in those with apparently uncomplicated cysts it was usually found only after attacks of pain simulating biliary colic.

To sum up, in uncomplicated hepatic hydatid disease the most frequent symptoms are upper abdominal pain and digestive disturbances, while the signs most often found are tumour, hepatomegaly, jaundice, bulging of the chest wall and signs of collapse of the lower lobe of the adjacent lung.

The presence of suppuration is suggested by the addition of the usual local and general manifesta-

tions of sepsis to this clinical picture, though these symptoms are often absent.

Rupture of the cyst leads to various symptoms depending on the structure into which the cyst opens.

(1) Rupture into a blood vessel may lead to: (i.) Sudden death from embolism with small daughter cysts; (ii.) anaphylactic symptoms—collapse, dyspnœa, cyanosis, vomiting and diarrhœa followed later by urticaria. Death may occur. This syndrome does not necessarily follow, as would be anticipated from the fact that the Casoni reaction reveals the presence of cutaneous sensitization to hydatid fluid in only a certain proportion of patients harbouring the parasite. (iii.) Secondary echinococcosis from the embolic sowing of minute daughter cysts or according to Dévé[8] scolices.

(2) Rupture of a cyst into a body cavity (pleura or peritoneum) may lead to: (i.) Anaphylactic symptoms, sometimes resulting in death; (ii.) pleurisy or peritonitis (chemical or bacterial); (iii.) secondary sowing of multiple cysts.

All the cysts in this series ruptured into the peritoneal cavity and these various results followed in different cases.

(3) Rupture may occur into any of the surrounding viscera: (i.) Into a bronchus with flooding of the lung and coughing up of the cyst contents; (ii.) into a bile duct with biliary colic, jaundice and passage of the cyst contents by the bowel. In seventy-six cases in which this occurred, Dévé[9] found the cyst contents in the stool in 95%. He[10] denies that the cyst frequently ruptures into the common bile duct and gall bladder. In 90% of cases it opens into the intrahepatic biliary vessels. This is a common method of discharge of the cyst contents, rarely diagnosed because the stools are not sifted. (iii.) Into the renal pelvis with renal colic and the passage of the cyst contents *per urethram* (usually with cysts of the kidney); (iv.) into the alimentary tract with passage of the cyst contents in the stool or in the vomit; (v.) externally.

In all these cases natural cure may result or secondary infection of the cyst may lead to further complications.

Case Records.

The following case records illustrate the various histories in complicated and uncomplicated cysts.

Uncomplicated Cyst.

Case 71, a female, aged forty-five years, was admitted with the history that twelve months previously she had a severe attack of pain in the right hypochondrium, stabbing in character and made worse on deep breathing or coughing. She vomited several times, was feverish and was confined to bed for a few days.

Complete recovery followed, but a little later pain commenced in the right shoulder and persisted on and off for some months. Five months previously the pain in the shoulder recurred and was followed by pain in the right hypochondrium. This pain had no relation to meals, but varied with posture and was increased on taking a deep breath. There was no vomiting. Since then the patient had been attending as an out-patient at one of the metropolitan hospitals without much improvement. She had never been jaundiced and there had been no loss of weight.

On examination the heart and lungs were found to be apparently normal. There was a distinct bulging of the right lower ribs anteriorly and the characteristic tumour was present in the right hypochondrium. The liver dulness extended from the fifth rib in the nipple line to 2.5 centimetres below the costal margin.

The differential leucocyte count showed 2.5% eosinophile cells.

After marsupialization of an uncomplicated cyst, the patient made an uneventful recovery.

Suppurating Cyst.

Case 48, a female, aged forty-eight years, stated that she had been quite healthy until two months previously when she was in bed for three weeks with right-sided pleurisy with effusion which was aspirated. Three weeks later sudden violent pain commenced in the right hypochondrium. She had rigors twice two days later. The pain lasted for eight days and since then she had felt very weak, this being now her chief complaint.

The heart was not displaced and there was a localized systolic murmur in the region of the apex beat.

There was dulness with absent breath sounds all over the chest on the right side below the level of the fourth rib anteriorly.

Nothing abnormal was detected in the abdomen.

In the next few days several rigors occurred and needling of the chest revealed pus. Operation was refused. The apex beat was outside the nipple line, while a loud rough systolic rub all over the mitral area obscured the heart sounds. A friction rub was also audible in both axillæ. The patient died six days after admission. The temperature in this period had been swinging between 36.7° C. (98° F.) and 39.4° C. (103° F.) daily.

Post mortem examination revealed ulcerative aortic endocarditis. About half a litre of clear fluid was present in the right side of the chest with resulting collapse of the right lung. There was no enlargement of the right lobe of the liver despite the presence of a large, firm walled, foul smelling, suppurating hydatid cyst at the posterior surface. The left lobe of the liver was somewhat hypertrophied and contained a very small hydatid crammed full of daughter cysts and commencing to calcify.

About 1.8 metres of the upper portion of the small bowel was in a condition of commencing gangrene apparently due to mesenteric embolism.

One point of interest is whether the suppuration of the cyst was secondary to the infective endocarditis or *vice versa*. Unfortunately there is no record of any bacteriological investigations.

Suppurating Cyst Rupturing into the Peritoneal Cavity.

Case 167, a male, aged fifty years, gave the history that he had always been well until six weeks previously. Pain then commenced and persisted about the region of the umbilicus.

Jaundice had been present for a short period, but there was no indgestion. A week previously while at work the pain suddenly became more acute and shifted to the right iliac fossa. It gradually increased in severity and spread over the whole abdomen. He vomited and had rigor about the time of onset of the acute pain.

On examination the pulse rate was one hundred and forty, respirations forty-four and temperature 36.4° C. (97.6° F.). The patient looked very sick. The conjunctivæ were icteric. There was relative dulness with diminished breath sounds over the right lower lobe of the lung posteriorly.

The abdomen did not move with respiration and there was generalized tenderness and rigidity especially in the upper part of the abdomen, while moving dulness was detected in the flanks.

At operation the peritoneal cavity was found to be full of pus and hydatid cysts. One unruptured and one ruptured suppurating hepatic cyst were drained, while the

assistant inserted a drainage tube through a suprapubic incision into the pelvis. After a stormy convalescence the patient recovered and left hospital within ten weeks of operation.

Non-Suppurating Cyst Rupturing into the Peritoneal Cavity.

Case 4, a male, aged twenty-two years, stated that five years previously he had within the space of eight months undergone five operations for hydatids. Since then his health had been excellent until the night previously, when he was kicked in the chest and almost immediately got acute generalized abdominal pain especially severe in the lower part of the abdomen. Pain had persisted since. He had been vomiting very frequently all night and the bowels had been open twice since the accident.

Examination revealed nothing abnormal in heart or lungs.

The abdomen moved freely with respiration and there was no rigidity. Generalized abdominal tenderness was present and there was dulness in the flanks.

Operation showed a ruptured cyst on the lower surface of the liver, with the cyst contents in the peritoneal cavity. Both the cyst and the pelvis were drained. The patient left hospital three weeks later. In the next ten years he underwent five more operations for mutiple hydatid cysts of the peritoneum.

The Diagnosis and Differential Diagnosis of Hydatid Disease of the Liver.

In hepatic hydatid disease an accurate diagnosis necessitates both an anatomical and a pathological diagnosis. The means of differentiation of tumours of the liver from those of surrounding organs are well known and will not be discussed.

The pathological diagnosis is more difficult. The means of investigation are three: (i.) Clinical, (ii.) by X-rays, (iii.) by biological tests, the most useful of which are (*a*) eosinophilia, (*b*) the Casoni intradermal reaction, (*c*) complement fixation test, (*d*) a modified precipitin test.

In certain typical cases the clinical diagnosis of hydatid disease is easy. A slowly growing, smooth, round, elastic tumour causing few symptoms is probably a hydatid cyst. But except in these obvious cases, little reliance can be placed on a diagnosis made by clinical examination alone. Even in Australia where this disease is comparatively common, errors in diagnosis are frequent. The figures given below fully illustrate this fact.

X-ray examination is a useful aid to diagnosis, but it is often at fault. Its chief use lies in the accurate localization of the cyst.

Biological tests are an invaluable help in the diagnosis of this disease. In a previous paper[11] it was shown that by the use of the Casoni reaction and the modified precipitin test combined in doubtful cases with an absolute eosinophile count, an accurate diagnosis of hydatid disease could be made in the vast majority of pre-operative cases. The complement fixation test is valuable, but it is too complicated for general use.

Exploratory needling cannot be too strongly condemned. In addition to the risks of anaphylaxis in patients yielding reaction to the Casoni test, there is the probability that multiple sowing of peritoneal cysts will follow leakage of the fluid.

Degeneration of the cyst does not alter the clinical picture to any great extent, but suppuration in the cyst increases the difficulty of diagnosis.

Of sixty-eight patients with non-suppurating cysts the correct diagnosis was suggested only in thirty. In five others the location of the cyst was faulty, hydatid disease of the lung, omentum and spleen being diagnosed. In twenty-one patients either gall stones or cholecystitis was thought to be present. Abdominal malignant disease was suspected in five patients, the gall bladder and stomach being the suggested primary sites. Cirrhosis of the liver, cholangitis, appendicitis, gastric ulcer and renal tumour were other diagnostic errors.

In four patients the trouble was thought to be situated above the diaphragm, pulmonary hydatid, tuberculosis and pleurisy being suspected. It has already been stated that several patients were treated for pleurisy a few months before admission to hospital with hepatic hydatid disease.

Of twenty-eight patients with unruptured suppurating cysts, the correct diagnosis was made in only eight. Cholelithiasis or cholecystitis was suspected in twelve others. Carcinoma of the stomach was the diagnosis in three patients, while cholangitis, appendicitis and renal tumour were rare diagnostic errors. Broncho-pneumonia and pulmonary abscess were diagnosed in two patients.

Of four patients with ruptured suppurating cysts, appendicitis in three cases and cholecystitis in one were suggested as the primary cause of the resulting general peritonitis.

Thus in one hundred cases of hydatid disease of the liver the correct diagnosis was made only in thirty-eight. These figures included both clinical and X-ray diagnosis, though the latter was utilized less frequently than was advisable. Disease of the gall bladder and bile ducts (stone, cholecystitis, malignant disease and cholangitis) was suspected in thirty-seven patients. Pulmonary conditions and gastric malignant disease were the other common errors in diagnosis, while appendicitis was frequently suggested in the case of ruptured suppurating cysts.

Case 255 illustrates how closely a hydatid cyst of the liver may simulate gall stones.

A female, aged twenty years, complained that for eighteen months she had suffered from attacks of pain in the right hypochondrium. The attacks began suddenly with severe colicky pain which radiated through to the back and up to the shoulder. The pain was accompanied by shivering and vomiting, and was followed by fever and jaundice, with clay-coloured stools and dark urine. She had suffered from flatulence and had lost a little weight in this period. The patient was jaundiced and there was some rigidity in the upper part of the abdomen with tenderness over the gall bladder. Murphy's sign was elicited. No tumour was palpable. The first operation revealed some adhesions between the gall bladder and the surrounding viscera with many soft glands (inflammatory on microscopical examination) in the gastro-hepatic omentum. No stones were detected in the biliary pasages, but as the wall of the gall bladder was somewhat œdematous, it was drained. A fortnight later the temperature rose to 39.4° C. (103° F.) and remained above normal. A rigor occurred and needling revealed a subphrenic collection of pus. A suppurating hydatid cyst of the liver was drained by the transpleural route and seven weeks later the patient was discharged.

The difficulty of diagnosis between gall stones and hydatid disease of the liver cannot be too

strongly emphasized. Recently within three months five patients with hydatid disease of the liver who had within the previous few weeks been operated on for cholelithiasis or cholecystitis, were in the Melbourne metropolitan hospitals. Nothing abnormal was found at operation and shortly afterwards the biological tests for hydatid disease showed in every case that the patient was harbouring the parasite. In three of these the cyst was suppurating, while in one it ruptured into the lung and only after a very stormy convalescence did the patient recover. In a few cases in this series hydatid cysts were discharged through the laparotomy wound at a variable period after an unsuccessful operation for suspected gall stones.

When at operation for suspected cholelithiasis or cholecystitis little is found in the biliary passages to account for the symptoms, the possible presence of hydatid disease should never be forgotten and the liver should be thoroughly explored. Prior to operation complete investigation is desirable, particularly in any case where there is definite enlargement of the liver, biological tests, X-ray examination and sifting of the stools for cyst contents all being important.

In three patients in this series gall stones were present as well as hydatid cysts. Cholecystitis was also occasionally observed.

Case 250 illustrates the difficulty of diagnosis in cases of hepatic hydatid disease which simulate gastric carcinoma.

A female, aged forty-seven, was treated for nine months by a prominent physician. She first sought advice after being ill for three months with epigastric pain which usually came on some little time after meals.

Definite improvement followed treatment on the usual lines for chronic gastric ulcer. Shortly before admission to hospital, however, the pain returned with increased severely. Considerable loss of weight had occurred. An indefinite mass was palpable in the epigastrium, while X-ray examination showed obvious pyloric obstruction. Exploratory operation revealed a calcareous hydatid cyst about 8.7 centimetres (three and a half inches) in diameter at the lower border of the liver.

In the differential diagnosis from malignant disease of the stomach the good general condition of the patient and the characteristics of the tumour are the main points on which to base an opinion. But the tumour may be difficult to palpate or even absent, while wasting is frequently present with complicated cysts. In such cases reliance must be placed on the results of X-ray and laboratory examinations.

In hydatid disease of the liver the pain is almost invariably in the upper part of the abdomen or the lower part of the chest. This is against the diagnosis of appendicitis and usually this condition is diagnosed only when a suppurating cyst has ruptured leading to general peritonitis.

The differential diagnosis between pulmonary lesions and hepatic cysts depends to a large extent on X-ray and laboratory examinations. The frequency of signs at the base of the adjacent lung in hepatic disease (hydatid cysts, amœbic abscess *et cetera*) should be remembered.

In hydatid of the base of the lung the heart is more likely and the liver is less likely to be displaced than in hydatid of the liver, while cough, hæmoptysis and dyspnœa are much more frequently present in pulmonary infestations.

The upper border of dulness in a non-loculated pleural effusion usually slopes downwards and forwards from the spine, while a curved upper border of the dull area is evidence in favour of a hydatid cyst. It should not be forgotten that a pleural effusion is not uncommon in cases of hepatic hydatid disease.

TABLE VI.

THE RESULTS OF OPERATIVE TREATMENT IN HEPATIC HYDATIDS.

Type of Operation.	Condition of the Cyst.										Total.	
	Uncomplicated.		Degenerated.		Suppurating.		Ruptured Suppurating.		Ruptured Non-suppurating.			
	Relieved.	Died.	Relieved.	Died.	Relieved.	Died.	Relieved.	Died.	Relieved.	Died.	Relieved.	Died.
WITHOUT DRAINAGE—												
Simple Closure	15	0	1	0	0	0	0	0	0	0	16	0
"Formalin" and Closure ..	10	1	3	0	1	0	0	0	0	0	14	1
Complete Removal of Cyst	5	0	1	0	0	0	0	0	0	0	6	0
Total	30	1	5	0	1	0	0	0	0	0	36	1= 2.7%
WITH DRAINAGE—												
Abdominal Route	46	4	18	1	32	5	1	4	2	0	99	14
Transpleural Route	13	0	4	1	13	2	2[1]	0	1[1]	0	33	3
Total	59	4	22	2	45	7	3	4	3	0	132	17= 11.4%

[1] Of the ruptured suppurating cysts opened transpleurally, one burst into a bronchus, the other into the biliary passages, as did also the ruptured non-suppurating cyst drained by this route. All the ruptured cysts opened by the abdominal route had burst into the peritoneal cavity.

From the numerous diseases, hepatic and extra-hepatic, less frequently simulated by hydatid disease of the liver the correct diagnosis in certain cases will only be made by the combination of the results of clinical, radiological and laboratory investigation.

The Treatment of Hydatid Disease of the Liver.

The majority of patients in this series were subjected to operation. The two patients who survived without operation long enough to leave hospital, were both very sick old men who would probably have died in a short time despite any treatment.

Tables VI. and VII. show the results obtained in one hundred and eighty-six cases of hydatid disease of the liver subjected to different types of operation. Until recently marsupialization of the cyst was practised in nearly every case, but latterly the method of formalinization and closure of the cyst has been frequently used. To obtain further figures with regard to this operation, the patients on whom operations have been performed at the Melbourne Hospital in the last two years, are included in these tables.

The average time spent in hospital after operation by the patients who recovered, and the average duration of the post-operative fever in these patients is shown in Table VII. under the headings "Days in Hospital" and "Days Febrile" respectively.

These tables clearly illustrate the advantages in suitable cases of the method of closure of the cyst as opposed to drainage. Practically all the cysts drained were marsupialized. With the former method it is seen that the mortality is lessened while the period of convalescence is greatly shortened, the patients usually leaving hospital between two and three weeks after operation.

Where it is possible (as in the case of a pedunculated cyst of the liver) complete removal of the cyst is the ideal operation. In the vast majority of patients this is impracticable. The operation of choice then is formalinization and closure of the cyst provided that regard is paid to the following contra-indications formulated by Barnett.[12] These comprise chiefly the presence of complications in the cyst. They are as follows: (i.) Cysts which do not collapse satisfactorily after evacuation of the contents on account of a rigid, leathery or calcified adventitia. Kilvington[13] on the other hand is inclined to consider this condition a definite indication for this operation. (ii.) Suppuration of the cyst usually necessitates drainage, though as the infection is often of low virulence, it may be sufficient to drain only for one or two days. Bond,[14] Quénu,[15] Hamilton Russell[16] and Kilvington[13] have recorded cases in which a suppurating cyst was successfully closed without drainage. Patients so treated sometimes show evidence of mild infection and are usually cured by one or two tappings of the reaccumulated fluid. It is therefore advisable to suture the closed cyst to the abdominal wall just under the wound to facilitate any such procedure. (iii.) Effusion of bile into the cyst, if it is at all pronounced, as the bile is frequently septic: (iv.) rupture of the cyst into surrounding viscera: (v.) hæmorrhage from a cyst wall; (vi.) multivesicular cysts in which it is difficult to be sure of the complete evacuation of all daughter cysts.

Only when there is a definite contra-indication to the closure of the cyst should marsupialization be performed.

Prognosis.

As may be seen from the various tables, the prognosis of hydatid disease of the liver depends on many factors.

TABLE VII.

THE AVERAGE DURATION IN DAYS OF CONVALESCENCE AND OF FEVER AFTER OPERATION IN THE PATIENTS WHO RECOVERED (SEE TABLE VI.).

Type of Operation.	Time of Recovery.									
	Uncomplicated.		Degenerated.		Suppurating.		Ruptured Suppurating.		Ruptured Non-Suppurating.	
	Days in Hospital.	Days Febrile.	Days in Hospital.	Days Febrile.	Days in Hospital.	Days Febrile.	Days in Hospital.	Days Febrile.	Days in Hospital.	Days Febrile.
WITHOUT DRAINAGE—										
Simple Closure	18.0	2.8	21.0	1.0	0	0	0	0	0	0
"Formalin" and Closure ..	19.5	4.3	14.7	5.3	77[1]	0	0	0	0	0
Complete Removal of Cyst	22.4	2.6	20.0	4.0	0	0	0	0	0	0
Average	19.2	3.3	17.0	4.2	77[1]	0	0	0	0	0
WITH DRAINAGE—										
Abdominal Route	39.4	3.7	45.5	8.3	47.8	7.1	68.0	14.0	30.0	7.0
Transpleural Route	42.0	8.8	80.0	9.0	50.0	8.6	70.0	9.0	50.0	13.0
Average	40.0	4.8	51.8	8.4	48.4	7.4	69.3	10.7	36.7	9.0

[1] This patient was subjected to another exploratory operation during her stay in hospital, but no further cysts were found. The old suppurating cyst had contracted down to a small fibrosed mass.

The age of the patient, the presence or absence of multiple infestation, the condition of the cyst, accurate early diagnosis and efficient operative treatment are all important. Table I. shows that the prognosis becomes worse with advancing years, particularly after the patient reaches middle age. As at least 50% of patients with hydatid disease of the liver have more than one cyst present (including secondary sowing of cysts), the prognosis particularly with regard to future operations should be guarded, while such multiple infestation necessarily makes the ultimate prognosis with regard to life much more serious.

Table II. shows that the presence of complications, particularly suppuration and rupture, increases the risk of a fatal termination.

The importance of early and accurate diagnosis is obvious, especially when it is remembered that many of these patients are subjected to an unnecessary operation on the gall bladder a few weeks before the diagnosis of hydatid disease is made.

Finally the outlook is influenced by the type of treatment instituted. So far intravenous medication with various drugs has proved useless and operation alone gives a prospect of cure. Where it is possible, complete removal of the cyst is the ideal. Otherwise, unless definitely contra-indicated, formalinization and closure of the cyst gives the patient a better chance of complete recovery than does any other procedure. Tapping of the cyst is dangerous and should only be done when in serious cases open operation is impossible.

The immediate prognosis of uncomplicated hydatid disease of the liver is good, the ultimate prognosis is always doubtful. In the presence of complications even the immediate prognosis should be guarded.

Conclusions.

1. Primary or secondary multiple infestation occurs in at least 50% of patients with hydatid disease of the liver.
2. Contrary to the usual teaching pain is the most frequent initial symptom of hepatic hydatid disease in adults, while most patients eventually seek advice on account of pain.
3. In any patient with persistent pain of the pleuritic type hydatid infestation of the lung and liver should be considered.
4. Digestive disturbances are the only other common symptoms of uncomplicated hepatic hydatid cysts.
5. Tumour and hepatomegaly are the most frequent physical findings in this disease.
6. Signs at the base of the lung may be due to a subdiaphragmatic lesion, hydatid disease of the liver, amœbic abscess *et cetera*.
7. Cholelithiasis and cholecystitis, pulmonary conditions and gastric malignant disease are the most frequent faulty diagnoses in cases of hepatic hydatid disease.
8. When at operation for suspected cholelithiasis or cholecystitis little is found in the biliary passages to account for the symptoms, the possible presence of hydatid disease of the liver should not be forgotten and the liver should be thoroughly explored.
9. Complete removal of the cyst is the ideal treatment, but it is generally impossible. The best method usually is formalinization and closure of the cyst. It should be done in all cases unless it is definitely contra-indicated.
10. The immediate prognosis in uncomplicated hydatid disease of the liver is good, while in complicated cysts it is doubtful. The ultimate prognosis in all cases should be guarded.

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PUBIOTOMY.

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ALTHOUGH there has been much discussion recently on the methods of dealing with difficult labour, on such occasions pubiotomy has been relegated to the background or ignored altogether. It will, therefore, be of interest to bring forward practical proof of the utility of pubiotomy as against academic argument. I saw Dr. Tweedy perform this operation once at the Rotunda Hospital, Dublin, in 1910, and since then I have performed it in the following cases.

Mrs. H. had had two long labours with difficult forceps delivery. Both fœtuses had died. The third labour had lasted for eight hours. The cervix was dilated partially, but there was no engagement of the head. Pubiotomy

was performed. The head was allowed to enter the pelvis by natural pains. Delivery was effected with forceps. Both mother and child did well. The mother has since had six confinements. On each occasion delivery with forceps was easy. All have remained well.

Mrs. F., a primipara, had been in labour for twenty hours. The head was presenting in the first position, but had not engaged the pelvis. Forceps failed to bring it into the pelvis. Pubiotomy was performed and delivery was effected with forceps. Both mother and child did well. The mother has had three forceps deliveries since. All the infants are well.

Mrs. C., a primipara, had been in labour eighteen hours. The head had not engaged. The head was rotated into the right occipito-anterior position. Forceps had failed to bring it into the pelvis. Pubiotomy was performed and delivery with forceps carried out. Both mother and child remained well. The mother has had two forceps deliveries since. All the babies are well.

Mrs. N., aged forty years, had two babies. Her pelvis was normal. The head was in the right iliac fossa with the shoulder presenting. *Liquor amnii* had drained away; the child was dead. Pubiotomy was performed. Owing to contraction of the womb on the fœtus I was unable to fix the head into the pelvis. The womb and fœtus were pulled down together. Cæsarean section was then performed. The mother is now well. She has had no more confinements.

Mrs. B., a primipara, had been in labour twenty-two hours. The head was in the right occipito-anterior position. It had not engaged. Forceps failed to bring it into the pelvis. Pubiotomy was performed and delivery effected with forceps. Both mother and child did well. She has had no more pregnancies.

Mrs. A., a primipara, had been in labour eighteen hours. The head had not engaged. The presentation had been converted into a left occipito-posterior presentation. Forceps had been applied, but it had been impossible to bring the head into the pelvis. Pubiotomy was, therefore, undertaken and the delivery was completed with forceps. Both the mother and the baby were well. The mother has had three subsequent instrumental deliveries since that date. All the infants are well.

Mrs. D., a primipara, had been in labour for nineteen hours. Her legs and abdomen were very œdematous. The urine contained one-fourth albumin. An attempt to make the head engage at the brim of the pelvis had failed. Pubiotomy was therefore performed, but even then the head could not be brought into the pelvis. In these circumstances Cæsarean section was carried out and a live child was delivered. The mother died twenty-six days later of Bright's disease.

Mrs. M., a primipara, had been in labour for twenty-five hours. The head was in the left occipito-anterior position, but had not engaged. An attempt to bring it into the pelvis by means of forceps had failed. Delivery with forceps was completed after pubiotomy and both mother and child have done well.

Mrs. E. had been twenty-one hours in labour with her first child. The head had not engaged. It had been rotated into the right occipito-anterior position, but forceps had failed to bring it into the pelvis. Pubiotomy had been performed, and delivery effected with forceps. Both had done well. At her next confinement the presentation was a face presentation in the right mento-posterior position. The promontory of the sacrum was wedged in the neck of the fœtus and prevented the head either from being pushed up or from being flexed. The right shoulder was pushed up and rotated to the left. The head was then forced into the abdomen, flexed and brought into the left occipito-anterior position and delivery with forceps was carried out. Both mother and child had done well. Since that time the mother has had another baby which had been delivered with forceps.

Mrs. O.B., a primipara, had been twenty hours in labour. The head lying in the left occipito-anterior position had not engaged and attempts to bring it into the pelvis by means of forceps had failed. Pubiotomy was, therefore, performed and forceps delivery had been successful. Both mother and child had done well. There has been one confinement since at eight and a half months and spontaneously delivery occurred.

Mrs. P., a primipara, had been in labour for twenty-one hours, but the head had not engaged. It had been brought into the left occipito-anterior position and forceps had been applied, but without success. Pubiotomy was then performed and delivery completed with forceps. Both mother and child have done well. There has been one subsequent delivery with forceps without untoward happening.

Mrs. H. had had a difficult labour with her first child. Forceps had been applied, but the child had died. At the second confinement in 1923 pubiotomy was performed at the commencement of labour. After operation the labour pains had been very strong. The nurse had injected a whole tablet of hyoscine and morphine instead of a half to relieve the pains. The child had been born spontaneously after four hours. It had been very apnœic and it had been difficult to establish respiration. After three hours the child had been left breathing fairly well, but it had died two hours later. The mother had done well.

Mrs. R., a primipara, had been nineteen hours in labour. The head was in the left occipito-anterior position, but had not engaged. An unsuccessful attempt was made to deliver by forceps. Pubiotomy was then performed and forceps delivery effected. Both mother and child have done well.

The main points in pubiotomy *versus* Cæsarean section are that although the former has its own difficulties and dangers, it is not such a formidable operation and can be safely undertaken by the general practitioner who, of necessity, conducts nearly all the difficult labours. The most important point is that it remedies the condition of contraction and leaves the pelvis larger, so that future deliveries may be comparatively easy and no further operation is required; Cæsarean section must be repeated for each confinement. Moreover, in minor contractions it obviates very difficult forceps deliveries with their attendant injuries to the head and their sequelæ of paralysis and the like. I have purposely omitted to give pelvic measurements although they were taken whenever possible. They depend so much on the personal equation. They have never been put to the test of corroboration. There are no records of several obstetricians separately attending the same patient at different confinements and recording the same internal measurements.

Other factors enter into the determination of a difficult labour, such as the comparative size of the head and pelvis, the fatness of the patient, the fact that a fœtus in an occipito-posterior position cannot be turned for various reasons, the weakness of the pains caused by exhaustion, the excessive or insufficient amount of *liquor amnii* rendering pains ineffective, the age of the patient, the fact that it is generally impossible to determine the age of the fœtus with accuracy, the state of ossification of the head and so forth.

Nevertheless when there is an opportunity to do so, careful external and internal measurements should be taken in every primipara before labour sets in and, if there is evidence of contraction, the patient should be examined during the last week to discover if the head has entered the pelvis and, if so, in what position and, if not, whether it can be pushed into the pelvis.

Good descriptions of the operation have been given by Tweedy and Jellett. In the cases referred to above their technique was carried out with the following modifications. The operation is dangerous when the head is so fixed in the pelvis that it cannot be pushed up. A blunt Döderlein needle should be used; a sharp one is unnecessary and dangerous. Packing the vagina to prevent or stop bleeding is unnecessary and harmful. Hæmorrhage which usually takes place from the vaginal plexus of veins, is easily controlled by pressure and can be avoided to a great extent by pushing the labium into the vagina while the point of the needle is made to emerge external thereto.

To facilitate passing the needle a vertical incision should be made through the skin and conjoined tendons on to the bone and the needle run along the knife through the tendon until it touches the bone; it is then kept close to the bone to its exit. After the bone has been cut, the bladder should be washed out with a little boracic acid solution to determine whether or not that organ has been injured. A little blood in the catheter is not significant, as the mucus membrane is usually congested and bleeds easily in squeezing out the last portions of the lotion.

Complications.

A wire saw broke once and the needle was passed a second time without difficulty. Three patients had large varicose veins of the vulvæ and in each there was sharp bleeding when the needle emerged. It was stopped with pressure and did not recur. The left sacral plexus of nerves may be stretched, owing to their connexion with the anterior sacro-iliac ligament at their emergence through the sacral foramina. Therefore forceps delivery must be very gradual and gentle or the head allowed to mould and to enter the pelvis by natural pains, care being taken to rectify an abnormal position, if one exists. In nearly all cases there was some tingling and numbness along the course of the sciatic nerve and one patient had pain for some weeks which disappeared and did not return.

The highest temperature in the series was 38.3° C. (101° F.); the fever lasted for one day. Practically all the patients were afebrile.

A small sequestrum of bone came away from the lower end of the needle track in Mrs. P. She had incontinence and the urine caused infection of the wound. She regained control after getting up and had no further trouble. The strictest aseptic technique must be carried out.

Leaving out two patients sent from elsewhere, one out of one hundred and twenty was operated on. The proportion is much higher if it is taken into account that one-fourth to one-third of all women in labour have no doctor.

There must be a great deal of infant mortality in difficult forceps cases, caused by minor degrees of pelvic contraction or deformity and from the same cause there must be a still greater number of cases of fracture and subdural hæmorrhage followed by paralysis, epilepsy, mental defects and so on. For those pubiotomy is specially suited, whereas Cæsarean section must remain a *dernier resort*.

Reports of Cases.

A CASE OF AMYOTONIA CONGENITA (OPPENHEIM'S DISEASE).

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AMYOTONIA CONGENITA in its extreme form seems to be rare enough to be worth reporting.

First described in 1900 by Oppenheim, there had been only seventy cases reported up to 1915, of which thirteen only had come to autopsy.[1]

I know that many more have been observed and reported on very thoroughly since then and that there is a controversy as to whether *amyotonia congenita* and Werdnig-Hoffmann's disease are not one and the same and whether they are not both related to the groups of amyotrophies.[2]

The evidence seems to be in favour of this view, in which case I prefer to give Oppenheim the honour, who gave its first description and considered it a primary myopathy, than to Werdnig and Hoffmann who described the type known as infantile progressive spinal muscular atrophy with a distinct heredito-familial tendency.

If we could be sure during life which patients have only a muscular degeneration with possibly absence of some anterior cornual cells, we might differentiate this condition as amyotonia from that associated with a post-natal degeneration of the anterior cornua.

In my case no autopsy was performed and I believe only one opportunity was given to any doctor to examine the child before it was moribund; that was my privilege for a few brief moments.

On April 13, 1923, baby E., *ætatis* thirteen months, was brought to me by its parents who considered it a little backward in crawling. There was no family history of pareses; one other member of the family, a sister, *ætatis* five years, was healthy. The father had suffered from tuberculous arthritis of the knee for which excision had been performed a few years previously. Consanguinity of parents was a possible factor (though I have not seen it mentioned in reports of any other cases) as the father and mother were first cousins on their fathers' side.

They could give only a very vague idea of when loss of muscular activity was first noticed. They were not very observant parents. I gathered that the baby's head had always to be held when taking the breast. Movements *in utero* had not been noticed by the mother to be weaker than usual.

The action of the sphincters, whether controlled or not, was much too difficult a matter for them to ascertain at such an early age.

The child's mentality appeared to be good, as it took notice and made its desires known.

On examination he appeared normally bright; there was almost complete paralysis and loss of tone of all the skeletal muscles, though the muscles supporting the spine did not seem to be as greatly affected as the extremities. He "crumpled up" when seated on the floor, but there was not much flexion of the spine and forcible flexion was not as great as normal. There was a slight contracture of the left trapezius, resulting in a mild torticollis. The eye and face muscles were normal; breathing appeared to be chiefly diaphragmatic. The only voluntary movements apart from the face were slight movements of the forearm at the elbow. There was a plantar flexor reflex present and also a cremasteric. All deep reflexes were absent. Protopathic sensation was normal. No examination of the electrical reactions was made.

The growth in length was abnormal, being eighty-one centimetres (thirty-two inches) as against the average sixty-nine centimetres (twenty-seven inches) for his age[3] and the greatest growth was in the spinal column which appeared abnormally long by contrast with the limbs.

This growth of the bones is of interest, for assuming that the skeleton might grow abnormally in length by virtue of the withdrawal of muscular restraint, yet in the case of the spine atony was not remarkable and if the

anterior cornual cells were affected, one would expect deficient growth.

A hopeless prognosis was given and I ventured to predict an early death from respiratory disease.

Dr. F. S. Mathwin, of Port Broughton, has since informed me that he was called to see the child for the first time in July last, when he was evidently dying of bronchopneumonia, to which he succumbed a few hours later.

My thanks are due to Dr. Mathwin who provided me with several points of interest with reference to the family history of the case.

References.

(1) Osler & McCrae: "Modern Medicine."
(2) Nelson: "Loose Leaf Medicine."
(3) Still: "Common Disorders and Diseases of Children."

A CASE OF CONGENITAL DIAPHRAGMATIC HERNIA.

By ROBERT SOUTHBY, M.D., B.S. (Melbourne),
Assistant Pathologist,
Children's Hospital, Melbourne.

S.C., a male, *ætatis* two and a half years, was admitted to hospital on February 22, 1923, with the history of pallor and weakness since birth. On numerous occasions the mother had noticed a peculiar gurgling sound in the child's abdomen. During the previous few weeks he had suffered from anorexia and great thirst.

The patient was a full time child. He had been breast fed for twelve months and since then had been having general diet. He commenced walking at the age of thirteen months.

During the previous winter he had suffered from bronchitis and rubella.

There was no suggestion of venereal infection in the family history. The patient was the youngest child of a family of six. The mother was approaching the age of forty-five at the time of his birth and she had been married twice.

On admission the child's weight was 9.86 kilograms (twenty-one pounds, twelve ounces). The clinical examination disclosed a thin, anæmic, somewhat icteric child, screaming continuously. There was a slight impairment of resonance at the right base posteriorly and an area with a distinctly tympanitic note on percussion above this level. The breath sounds appeared to be normal when heard between the spasms of crying. The abdomen moved well with respiration, but loud borborygmi could be heard and were accompanied by a peculiar impulse which was felt in the upper part of the abdomen, particularly on the right side.

The heart sounds could be heard distinctly over the epigastric region and down to the level of the umbilicus. Apart from these findings no abnormal signs were detected.

The next day the borborygmi and palpable impulse had disappeared and the child appeared quite happy and contented.

The following investigations were then carried out. The von Pirquet test: There was no reaction to human or bovine tuberculin. The Wassermann test: The blood did not yield a reaction on two occasions. Blood examination:

Erythrocytes	2,800,000
Leucocytes	13,600
Polymorpho-nuclear cells ..	32%
Mono-nuclear cells	68%
Hæmoglobin (Sahli)	20%

The film showed a moderate degree of anisocytosis and poikilocytosis with a tendency to polychromasia; one normoblast was seen among two hundred and fifty white cells, but no megaloblasts; numerous platelets were present.

The following report of the X-ray screen examination was received: "Some consolidation at the medial part of the right base and some mottling below the right clavicle; the latter appearance suggests tuberculous infection."

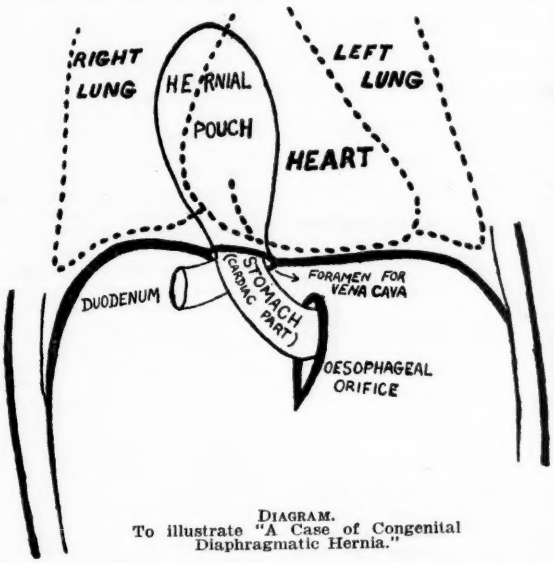

DIAGRAM.
To illustrate "A Case of Congenital Diaphragmatic Hernia."

The mother's blood also did not react to the Wassermann test.

In view of these findings the condition was regarded as one of severe anæmia of unknown origin and the child was given a mixture of *pulvis hydrargyri cum creta*, 0.03 gramme (half a grain) and *pulvis ferri carbonatis saccharatæ*, 0.24 grammes (four grains), the latter being increased to 0.36 grammes after four weeks; the powder was administered three times daily. The general condition rapidly improved and the anæmia gradually diminished as shown by the periodical blood examinations (see table below).

At this stage the child looked quite strong and healthy, enjoyed a good appetite and had gained weight considerably, but the mother stated that she still heard the "gurgling sound" from time to time.

On July 27, 1923, the patient was re-admitted with a history of fever, dyspnœa, apathy and anorexia, accompanied by a persistent cough since an attack of morbilli seven days previously. On examination the temperature was 37.4° C. (99.4° F.), the pulse rate one hundred and sixty and the respirations sixty-four. The child was very ill and cyanosed. There was a small impetiginous lesion below the left eye and auscultation of the chest revealed

TABLE.

Date.	Hæmoglobin (Sahli).	Erythrocytes.	Leucocytes.		
			Number.	Polymorpho-nuclear cells.	Mono-nuclear Cells.
March 29, 1923	55%	3,550,000	16,000	22%	78%
April 17, 1923	75%	4,500,000	15,600	72%	28%
May 22, 1923	82%	4,800,000	15,000	61%	39%
July 10, 1923	90%	5,000,000	17,000	60%	40%

definite physical signs of an extensive broncho-pneumonia. The general condition gradually became worse; two days later the right ear commenced discharging and the patient died on July 31, 1923.

Autopsy.

The body was that of a fairly well nourished male child. Several impetiginous lesions were present beneath the left eye and in the circum-oral region.

The meninges exhibited extreme venous congestion, but no meningitis. The middle ear cavities were filled with thick, greenish-yellow muco-pus and the right tympanic membrane was perforated.

There was nothing unusual discovered in the heart. Diffuse lobular consolidation was present throughout both lungs, associated with considerable pulmonary œdema. No fluid was found in the pleural cavities.

In the region of the foramen for the *vena cava* the diaphragm was very thin and dilated into a large pouch which projected into the posterior mediastinal space, where it had the right lung and the right side of the heart as anterior relations and the *vena cava* on its posterior aspect. This sac contained almost the entire stomach and portion of the duodenum, the former appearing to pass directly from the œsophageal orifice into the pouch in such a way that it became inverted. The pylorus was situated at a higher level than the cardia.

The stomach could be returned from the sac to the abdominal cavity and *vice versa* without difficulty, although there was a well defined ring at the opening in the diaphragm.

The remaining abdominal viscera showed nothing of interest.

Points of Interest.

This case history appears to be worthy of record for the following reasons:

(i.) The rarity of the condition of congenital diaphragmatic hernia particularly on the right side.

(ii.) The malnutrition, anorexia and thirst all due apparently to the abnormal position of the stomach and consequent poor digestion of food.

(iii.) The extreme degree of anæmia and the response to treatment with iron.

(iv.) Borborygmi noticed by the mother and obviously produced by the stomach slipping from the abdominal cavity to the hernial pouch and *vice versa*.

(v.) The fact that the child was the youngest of a large family; the reproductive activity of the mother was probably nearing exhaustion.

Reviews.

ARTIFICIAL LIMBS.

THE impression gained on reading "Artificial Limbs and Amputation Stumps,"[1] by Mr. E. Muirhead Little, is that the subject has been approached from the standpoint of the surgeon responsible both for amputating the limb and for fitting the stump with a suitable prosthesis.

The chapters devoted to amputation stumps give us the author's summing up the results of an extraordinarily large experience gained during the Great War. Some of the older standard amputations have been shown to be useless from the point of view of the limb-fitter. On the other hand the author has given exact instructions regarding the best levels for amputation in varying circumstances.

Artificial limbs are discussed in much detail. The most suitable replacements for every amputation and for every variety of employment are carefully explained. Although the author has admitted that the upper limb prostheses "at best serve to mask the mutilation," he offers a complete description of all the best varieties of replacements and shows that some of them can be very helpful, when used by a man of intelligence in manipulating various kinds of tools.

The chapter of provisional prostheses is very helpful.

The author devotes a chapter to the analysis of normal walking movements and produces charts prepared from a cinematograph film of an uninjured man who walked in his usual manner. In this chapter and the one devoted to mechanics of prostheses the principles to be considered in fitting artificial limbs are clearly enunciated.

The appendices contain the specifications for the manufacture of artificial limbs. A knowledge of these matters would enable the surgeon to apply critical judgement in examining artificial limbs for faults in construction.

Altogether the work is very complete. It is based on a very large experience by a surgeon who in addition to his professional work had access to the results obtained in the experimental workshop of the Ministry of Pensions. The book is well illustrated.

RADIOLOGICAL EXAMINATION AND DIGESTIVE DISEASES OF CHILDREN.

IN their book on the digestive disturbances in infancy and childhood Röentgenologically considered Kerley and Le Wald discuss the various conditions and illustrate their diagnosis by means of opaque meals and X-rays. The book consists of a short letterpress and an excellent series of X-ray photographs with a liberal use of lettering and arrows to demonstrate clearly the important features of each picture.[1]

The majority of the plates are illustrative of pyloric stenosis and its differentiation from pyloric spasm. Ptosis in the child is demonstrated and its occasional association with cyclic vomiting are mentioned. The symptoms of dilated caecum with fæcal retention are well discussed and the differential diagnosis between this condition and appendicitis, for which it is often mistaken, clearly stated. Other conditions, as gastroptosis causing delay in stomach emptying, foreign bodies and the indications for operation, chronic appendicitis, congenital syphilis of the stomach, tuberculous peritonitis and intussusception are all beautifully illustrated and the value of X-rays in their diagnosis demonstrated. Opposite each plate there is a short clinical history, details of the examination, treatment and comments. The book can be highly recommended to the pædiatrician and shows clearly what an immense help such a method of investigation can be in difficult cases of gastro-intestinal disturbance.

CHEMICAL PHYSIOLOGY.

THERE is obviously a demand for a work which passes through eleven editions and a detailed analysis is unnecessary. The latest edition, the eleventh, of "The Essentials of Chemical Physiology," by W. D. Halliburton,[2] does not differ materially from its predecessor and maintains its high standard. Some new exercises dealing with the detection of enzymes, the estimation of oxygen in blood and of gastric juice *et cetera* have been inserted. The book still retains its division into three parts, an elementary course, an advanced course and an appendix, although it is not clear why this is done. For example, carbo-hydrates are treated in all three sections. The selection of experiments is a good one and the biochemical principles involved are set out in a lucid fashion. The book is thoroughly up to date. While in no sense a complete laboratory manual, it is a very useful book for students.

[1] "Artificial Limbs and Amputation Stumps: A Practical Handbook," by E. Muirhead Little, F.R.C.S. (Eng.); 1922. London: H. K. Lewis & Company, Limited; Demy 8vo., pp. 319, with 267 illustrations. Price: 18s. net.

[1] "Digestive Disturbances in Infants and Children Roentgenologically Considered," by Charles Gilmore Kerley, M.D. and Leon Theodore LeWald, M.D., being Volume Three of the Annals of Roentgenology, A Series of Monographic Atlases, edited by James T. Case, M.D.; 1923. New York: Paul B. Hoeber; Demy 4to., about 80 pages of letterpress in three languages (English, French and Spanish), 52 full page plates with descriptive legends and 49 illustrations. Price: $12.00.

[2] "The Essentials of Chemical Physiology for the Use of Students," by W. D. Halliburton, M.D., LL.D., F.R.S.; Eleventh Edition; 1922. London: Longmans, Green & Company; Demy 8vo., pp. xi. + 343, with 70 illustrations and one coloured plate. Price: 8s. 6d. net.

The Medical Journal of Australia

SATURDAY, FEBRUARY 23, 1924.

Basal Metabolism.

A CORRESPONDENT has recently written to us to inquire what is meant by the basal metabolic rate and how it is determined. Although many excellent descriptions of the application of the indirect methods of estimating the basal metabolism have been published in this and other medical journals during recent years, it is probable that our correspondent belongs to a large class of medical practitioners who have not been able to form a clear idea of the physiological principles underlying this work and consequently fail to appreciate the significance of these estimations.

It has long been known that life is dependent on the supply of heat derived from chemical combustion of food. The nutrition of every cell in the body is maintained by material brought to it through the blood and lymphatic channels and in the process of the discharge of its function these substances are burned. The waste products are carried away and the heat liberated by combustion represents the energy of the cell. If the body be viewed as a whole, the material supplied as food must provide the energy, unless the tissues are to be utilized, in which case there will be wasting. The components of the food ingested when completely burned will yield a definite number of calories or heat units. While this source of energy is taken into the body at intervals, the process of utilization goes on more or less continuously, so that the rate of metabolism is relatively even.

The term basal metabolism is used to signify the essential amount of combustion occurring in a person at physiological rest and in metabolic balance. A great deal of information concerning the utilization of heat in the production of energy was supplied several years ago by Rubner. For our present purpose it is unnecessary to discuss the many contributing factors concerned in the supply of fuel for a human being performing work. All that is needed for a general understanding of the mechanism of the basal metabolism is that fuel in the form of food is provided and that this fuel is burned at a slow or rapid speed according to the temporary physiological condition of the body cells. While a person is at rest, certain organs are working at a definite minimum rate. The most obvious activity is that of the heart which expends the minimum amount of energy during rest unless some pathological lesion creates a demand for extra energy to overcome the altered conditions of the circulation. With other tissues the continuous activity is much less obvious, but it is present in health, even during complete physiological rest. The basal metabolic rate is, therefore, determined by the physiological condition of the cells. Since energy means liberation of heat by combustion, the basal metabolic rate is best expressed as a measure of the consumption of oxygen on which combustion depends. It can also be measured by the amount of carbon dioxide produced as a product of combustion. The direct measurement of heat produced is an extremely complicated matter, but it has been necessary to employ it in order to establish some of the fundamental facts involved. Atwater and Benedict constructed a series of apparatus, culminating in their large calorimeter. Hagemann followed them and constructed an extremely costly and complicated large calorimeter by means of which the metabolism, including the basal metabolism, of man and animals as large as an ox could be studied over lengthy periods. Atwater and Benedict have presented the world with a great mass of highly important information concerning the manner and rate of metabolism of foods, of alcohol and of body tissue. Hagemann turned his attention especially to the variations of the metabolism in pregnant animals.

These large calorimeters served their purpose and continue to do so in enabling physiologists to study physiological processes in health and disease. They cannot be utilized for clinical purposes to determine the metabolism in individual patients. For this purpose the indirect methods have been devised and perfected. A portable machine has been

devised by Benedict for the estimation of the oxygen consumption. Some observers have chosen to control the results by determinations on the carbon dioxide production. The patient is required to breathe a mixture of one volume of air and two volumes of oxygen. In practice it has been found that at first the patient may be nervous and somewhat alarmed at the sight of the apparatus and in consequence the rate of the respiration and the rate of the heart beat are accelerated and are irregular. Soon this preliminary excitement passes off and the amount of oxygen consumed in a given period of time is ascertained. Corrections are needed for variations in the body temperature. The temperature of the air-oxygen mixture must be known and adjustments made to keep it constant. The basal metabolic rate is the ratio of oxygen consumption to the area of the surface of the person's body. Du Bois has worked out elaborate tables. His calculations were based on an assumed constant ratio of height and weight to area of body surface. In 1919 Dreyer endeavoured to show that there was a definite correspondence between basal metabolism, the area of body surface, the body weight, the height of the trunk and the circumference of the chest. For practical purposes Du Bois's tables are sufficiently accurate.

This elementary account of the aims and methods of indirect calorimetry should suffice to render the significance of an increased basal metabolic rate in Graves's disease, to take a practical example, clear. The disturbance of the glands of internal secretion involves an increased basic activity. At rest all the tissue cells of the patient are working at higher pressure than normal and more energy is expended. This means a greater consumption of oxygen, which can be expressed numerically by what is known as the basal metabolic rate.

Current Comment.

PSORIASIS.

SEVERAL theories have been put forward to explain the causation of psoriasis. The older writers who supported the humoral theory of its origin, regarded psoriasis as an expression of gouty diathesis. Attempts to confirm this view have not been crowned with success and it may be said that it has been definitely abandoned. Two other theories remain, the neuropathic and the microbic theories. The neuropathic theory was enunciated by Barduzzi and Weyl. The latter thought that psoriasis probably depended on a congenital weakness of the nerve centre regulating the nutrition of the skin and that the eruption was the peripheral expression of the central disturbance excited by irritations acting along certain hereditary lines. Those who hold this theory, point out that the disease is often hereditary, that it is not contagious, that it cannot be inoculated, that it may be incited by local conditions, that it is symmetrical, that it may be aggravated by various mental disturbances and that it is incurable. They also lay some stress on its supposed coexistence with other nervous symptoms, particularly in neurotic patients. The microbic or parasitic theory was propounded by Lang, of Vienna. He drew attention to the close resemblance of the rings and gyrate figures to those produced by dermato-mycoses and of the discoid plaques to the diffuse spread of *pityriasis versicolor*. It is interesting to note that in spite of the many attempts that have been made to inoculate human beings with psoriasis, Destot on one occasion succeeded in producing a patch of psoriasis on the elbow of an individual fourteen days after inoculating psoriasis scales on the forearm. Lang pointed out that in regard to *tinea versicolor*, a disease known to be caused by a fungus, attempts at inoculation had not proved successful in more than one or two instances. Supporters of the microbic theory have suggested that the influence of heredity may only be evidence of direct transmission of the disease from one member of a susceptible family to another. They have also pointed out that the symmetrical character of the lesions is by no means usual unless the disease is very extensive or is spreading rapidly. There are many more arguments for and against the acceptance of each of these theories. Brooke and MacLeod have suggested that both internal and external causes may be operative. They thought that the neuropathic factor might be primary and the parasitic or microbic factor secondary, but necessary to the full manifestation of the lesions.

Dr. A. Strickler and Dr. E. Asnis have investigated the subject.[1] They examined blood specimens from twenty-seven psoriatic patients in the hope of finding some form of spirochæte. They refer to the attempts of previous workers to find the causative micro-organism in this way. In no instance were they successful. The blood sera of thirty-four psoriatic patients were examined by means of a Wassermann test. Two antigens were used, the alcoholic extract of human heart and the same antigen fortified with cholesterin. In no instance was a reaction obtained. The third aspect of the work of these observers consisted in the examination of blood smears from twenty-seven patients suffering from psoriasis in all its manifestations. Differential leucocyte counts were made and the percentage of lymphocytes noted. Drs. Strickler and Asnis accept Cabot's statement that a lymphocyte percentage of

[1] *Archives of Dermatology and Syphilology*, October, 1923.

twenty to thirty is normal and that anything over this number must be regarded as pathological. It will be remembered that K. Douglas Fairley in his recent work on the leucocytes found that the average percentage of lymphocytes in twenty-nine normal individuals was 39.1. Drs. Strickler and Asnis found that in twenty-two of the patients the percentages of lymphocytes exceeded thirty. If they regarded the normal percentage as thirty-five the number with a lymphocytosis was fourteen. In their calculations they did not include large lymphocytes in their percentage estimates. Fairley in his work included both large and small lymphocytes in his estimate of 39.1%. Allowing for this difference the number of patients with a lymphocytosis in the series of Drs. Strickler and Asnis on a basis of Dr. Fairley's findings was fourteen.

In discussing their results Drs. Strickler and Asnis state that definite lymphocytosis is often found in chronic infective processes of both bacterial and parasitic origin. The isolated fact of the lymphocytosis *per se* is not of any importance, but they think that when considered in its broad aspect and in comparison with other conditions associated with a lymphocytosis it assumes considerable significance. It may be noted, however, that they do not give the absolute number of leucocytes per cubic millimetre in addition to their relative percentages. An increase in the percentage of lymphocytes in the blood may mean either an increase or a decrease in the absolute number of lymphocytes.

THE CIRCULATORY SYSTEM IN ERYTHRÆMIA.

In a recent issue we drew attention to some interesting work which had been carried out by Minot and Buckman in regard to the nature of the condition known as erythræmia or *polycythæmia vera*. Further investigations have been made by Dr. George E. Brown and Dr. Herbert Z. Giffin into the blood volume and the changes in the capillaries in this disease.[1]

Study of the capillaries has been possible since Lombard in 1912 described his method of observing the capillaries in the human finger. Reference has been repeatedly made to this method in the pages of this journal and to the conclusions which have been reached as a result of its use. The capillary loop as observed in the finger of a healthy person consists of three parts. There is an afferent or arterial segment, a connecting limb and an efferent or venous segment. Drs. Brown and Giffen state that the morphology of the normal loop has not yet been accurately determined. They state, however, that the average length of the arterial segment is 0.15 millimetre, the average length of the connecting limb is 0.034 millimetre and that of the venous segment 0.18 millimetre. The average length of the entire loop is 0.364 millimetre. Variations in the rate of flow in the capillary loops occur in various conditions. In shock and septicæmic conditions and in cardiac disease alterations of the rate of flow may be noted. It is also necessary to remember that the rate of flow in different loops in the same finger may occur. Drs. Brown and Giffin have determined that the average rate of flow in individual loops is approximately 1.01 millimetres per second.

Among the patients studied by these two observers were five who suffered from erythræmia, one who had congenital heart disease associated with erythræmia, and one in regard to whose condition a provisional diagnosis of erythræmia was made. In every instance but two considerable lengthening of the segments of the loops were noted. Tortuosity and dilatation of the loops was also seen. The rate of flow was diminished to a considerable extent. It is not necessary to quote the actual figures in this connexion. In two instances the rate of flow was too rapid for accurate measurement. The movement of the erythrocytes was *en masse* rather than in the usual single file manner observed in normal individuals. No sudden or uneven changes in speed were noted and no complete stasis was seen unless the hand were exposed to lower temperatures.

According to Keith, Rowntree and Geraghty the total volume of the circulating blood in normal individuals varies from 78.5 to 97 cubic centimetres for each kilogram of body weight. The average ratio of total blood volume to body weight is one to 11.4. The plasma volume varies from forty-two to fifty-six cubic centimetres for each kilogram of body weight. The average ratio of plasma volume to body weight is 1 to 19.4. In these patients of Drs. Brown and Giffin little increase in plasma volume was found. The total circulating blood volume, however, was definitely increased. In one instance the ratio of blood volume to body weight was as high as one to 4.4.

In discussing their results Drs. Brown and Giffin state that the vascular changes in erythræmia are concerned with readjustment of the vascular bed to the augmented blood volume, the changes in the vessel walls due to strain or metabolic disturbances, vascular plugging due probably to thrombotic processes as a result of increased viscosity of the blood and changes in the vessel wall and the coagulation factors of the blood and lastly with changes in the erythrogenic tissue. They confine themselves to the changes in the vascular bed. They point out that their observations are in agreement with the clinical features of the disease. The differences in the appearances of the venous and the arterial limbs often allow a clear cut demarcation of these segments. The connecting limb seems to be part of the venous segment. The suggestion is made that this indicates either an essential difference in the endothelial tissue or a difference in the vaso-motor control. This is a hypothesis which requires much further investigation. That the viscosity of the blood and the increase in its mass are large factors in the retardation of the rate of flow is obvious. Drs. Brown and Giffin suggest that the slow rate of flow is compensatory in view of the abnormally high oxygen content.

[1] *The American Journal of the Medical Sciences*, October, 1923.

Abstracts from Current Medical Literature.

GYNÆCOLOGY AND OBSTETRICS.

Gonorrhœal Stricture of the Rectum.

CHARTERS SYMONDS (*Proceedings of the Royal Society of Medicine*, January, 1923) reports a series of seven instances of gonorrhœal stricture of the rectum occurring as a complication of gonorrhœa in women. In all the stricture involved the lower seven to ten centimetres, including the anal margin, but in some it reached to the pelvic colon. It affected the whole circumference of the bowel; it was characterized by bands and bundles of indurated and fibrotic muscle. Between these were pockets, from the bottom of which fistulous tracks might lead into the vagina or on to the surface round the anus. The extreme narrowing may occur at several points and may be so tight in advanced cases as to prevent digital examination or the passage of a small bougie. One characteristic is the presence of hard polypoid growths surrounding the anal margin, a condition not seen in any other form of stricture, except that sometimes attributable to dysentery. The history given by the patients is that of discharge from the rectum, together with difficulty in defæcation extending over some years. In married women these symptoms frequently date from the early days of wedded life. The author examined thirty-eight specimens of stricture of the rectum in various London museums. From these and from the findings in his own patients, he concludes that while the majority of these strictures have been described as syphilitic, they are really due to gonorrhœal infection. One of the reasons for his conclusion is that thirty-nine occurred in women and only six in men. In many of them there was evidence of associated inflammation of the uterine tubes. For treatment he advises the use of bougies in the early stage, but not in the later. Division or excision may be adopted if the limit can be reached by the finger. Colostomy, caecostomy and appendicostomy are all of value as preliminary measures.

Adenomatosis Vaginæ.

B. WHITEHOUSE (*Proceedings of the Royal Society of Medicine*, April, 1923) read a paper before the Royal Society of Medicine in which he described an instance of *adenomatosis vaginæ* occurring in a woman, aged forty years, who had given birth to two children. She gave a history of constant muco-purulent vaginal discharge of some years' duration, unrelieved by the usual methods of drenching, tamponage and various applications to the cervix. The cervix was deeply lacerated, fibrosed and everted. It was the seat of numerous small cysts of the Nabothian type. The cystic condition extended to the upper half of the vagina. Both the anterior and the posterior walls were studded with cysts varying in size from a pin's head to a small pea. The right vaginal fornix was packed with these cysts and they extended on the right side of the vagina in a chain almost to the vulva. Some of the cysts appeared translucent and resembled sago granules. Others were sub-epithelial and could be palpated only as nodules. In general the vaginal epithelium appeared healthy and intact, without any inflammatory reaction. The cervix was amputated, several cysts were excised for examination and the remainder obliterated by cautery. The larger cysts were lined by a single layer of flattened cells and the smaller ones by cubical and columnar cells. They were embedded in a fibrous matrix with no inflammatory reaction. The uterus was of the *bicornis unicollis* type. The author regarded the cysts as a very exaggerated instance of chronic inflammatory reaction and extension from the cervix. In the discussion which followed, T. W. Eden said that he thought the cysts might arise from embryonic rests of Müllerian epithelium; that the occasional occurrence of simple tubular glands in the vaginal wall which had been demonstrated by several observers, might be explained in the same way.

Radium and Uterine Hæmorrhage.

SIDNEY FORSDIKE (*Proceedings of the Royal Society of Medicine*, June, 1923) gave an account of his experience in the treatment of severe and persistent uterine hæmorrhage by radium, with a report on forty-five cases. The type of condition dealt with is sometimes called the "bleeding uterus" or "chronic metritis," "*fibrosis uteri*" or "chronic sub-involution." There is excessive and uncontrollable hæmorrhage with absence of any pelvic lesion to account for it. The patients treated were selected because of (*a*) the persistence of severe hæmorrhage after operative treatment, (*b*) an advanced anæmia, with shortness of breath, headaches, œdema of legs *et cetera* which had been treated palliatively for some time, (*c*) confinement to bed in some instances for some part of each month. Twenty-six patients had been operated on previously. Clinically there were two types of uteri: a systolic type which was firm and regular, usually straight and admitted a sound for 7.5 to 8 centimetres and a diastolic type which was bulky, retroverted, admitted a sound for 8.5 to 12.5 centimetres and yielded a thickened and œdematous tissue. In all instances the cervix was dilated and an exploratory curettage performed. Fifty to one hundred milligrammes of radium were placed in the uterus for twenty-four hours. There was no further menstruation in ten instances, one period occurred in seventeen, two periods in eleven and three periods in four. There were very slight vaso-motor symptoms. The available clinical and experimental evidence points to action solely on the uterus in the majority of cases with no ovarium destruction. The only contra-indication is previous pelvic inflammation. If used in these conditions there is a very severe inflammatory reaction.

Tuberculosis of the Genitalia.

BETHEL SOLOMONS (*Surgery, Gynecology and Obstetrics*, June, 1923) reviews the literature of tuberculosis of the genitalia. Of the reported instances of the condition 25% have occurred in children. In the adult the incidence is mainly between thirty-five and forty years of age. Tuberculous warts occur and may go on to a pseudo-elephantiasis. Bartholini's gland is seldom affected. Treatment by excision is most satisfactory when possible. X-rays have had a good effect. The vagina is rarely attacked on account of its squamous epithelium and the absence of glands. Tuberculosis can be differentiated from syphilis and cancer only by the microscope. In the uterus tuberculosis may occur as a direct conjugal infection. There is a great divergence of opinion as to whether there is ever primary tuberculosis in the uterus, but several authorities state that undoubtedly instances have occurred. Infection of the cervix is extremely rare and when present is difficult to diagnose both clinically and microscopically from malignant disease. Cell nests may be confused with epithelioid cells. It may be treated by high hysterectomy and X-rays. In the uterine body there may occur a tuberculous endometritis. This may require a prolonged microscopical search to establish the diagnosis. The uterus may sometimes assume the appearance of a fibroid uterus. The treatment varies from curettage to hysterectomy. Tuberculosis of the tubes is the commonest type of tuberculosis of the genitalia. The infection may spread up from below, down from above or be borne by the blood stream. The author distinguishes four groups: (i.) The tubes are slightly enlarged and when the abdomen is opened the definite diagnosis of tuberculosis is impossible; (ii.) the tubes are much enlarged and tubercles are present; (iii.) tubercles are present on the tubes and the diagnosis is obvious and (iv.) the tubes and abdomen are involved in generalized tuberculosis. The symptoms give no clue to the disease. Sometimes there is a family history of tuberculosis. Sterility and leucorrhœa are the commonest complaints the author has encountered. Menstruation lasting for two days, ceasing for a day and then continuing for two or three more days leads the surgeon to suspect tubal disease when nothing abnormal can be felt. Some observers describe amenorrhœa as a symptom, but the author has found it only when a large pyosalpinx has involved the ovary or general phthisis is present. Dysmenorrhœa, menorrhagia and metrorrhagia are occasionally present. The signs depend on the variety and there may be felt

varying degrees of enlargement from a slight thickening of the tube to enormous pus sacs. The author considers that double salpingectomy gives excellent results and that hysterectomy is unnecessary. Tuberculosis of the ovary as a separate entity is rare. When present, it is nearly always bound up with the diseased tube and the tube should be removed with the ovary.

NEUROLOGY.

The Parkinsonian Syndrome Following Encephalitis Lethargica.

DOUGLAS MCALPINE (*Brain*, October, 1923) gives an account of the histological findings in two instances of the Parkinsonian syndrome following *encephalitis lethargica*. The most constant discoveries were subacute inflammatory changes and recent perivascular hæmorrhages. In one case the *substantia nigra* showed definite degenerative changes, but in the other this area appeared normal. Large hæmorrhages, however, of arteriosclerotic origin were present in the basal ganglia of the second patient. An account is given of fourteen similar instances reported in the literature, in all of which the *substantia nigra* was affected. The writer surmises that in idiopathic *paralysis agitans* a lesion of the *globus pallidus* or possibly of the subthalamic structures with which it is connected, is the usual pathological basis of the disease; whereas post-encephalitic Parkinsonism is usually due to degeneration of the *substantia nigra*. The paper also contains an account of calcification in and around the blood vessels. This calcification was found in the anterior part of the *globus pallidus* in six instances of *encephalitis lethargica*, in one as early as the fourth day of the disease. The calcification was present both in the vessel walls and in the form of perivascular globules. Fat globules were also noted in one instance and it is supposed that these are related to the peri-vascular globules.

Cerebellar Localization.

SVEN INGVAR (*Brain*, October, 1923) concludes that the basal portions of the cerebellum, situated immediately above the fourth ventricle, are phylogenetically the oldest parts of the cerebellar cortex and are endowed with important functions. According to studies previously made by the author they receive fibres directly from the vestibular nerves. Since the histological uniformity of the cerebellar cortex suggests that function and organization of function are probably the same in the whole organ, any evidence regarding special function in the basal regions is of value. After lesions of the basal parts phenomena known as "forced movement" occur. Russell and others have shown that after lesions of the posterior lobe these "forced movements" appear chiefly as a falling backwards. And since these movements strongly resemble vestibular disturbances, they may be regarded as being due to the vestibular innervation of these parts. According to the writer, the rapid disappearance of the "forced movements" is no argument that they are not of cerebellar origin. Since the basal regions of the cerebellar cortex with their vestibular connexions are a sort of calyx enclosing the major part of the later developed cerebellum, so the functions of the labyrinth may be said to include in embryo those of the cerebellum. During phylogenetic development there is evidence of a tendency to regression of the vestibular and increase of the spinal influence on the cerebellum (development of spino-cerebellar tracts). There exists an almost complete homology between all parts of all cerebellums, accordingly in all the same system of functional localization must hold. Experiments seem to show that in animals the limbs are represented in special regions of the cerebellar cortex, the forelimb rostrally to the hind limb. Two instances are reported in this paper which support the views that in man there is the same arrangement of the centres of homologous parts. In the first instance a tumour lay in the right *lobulus biventer* and the only clinical sign was cerebellar ataxia of the right leg. In the second instance the semi-lunar lobes, *lobulus gracilis* and part of the *lobulus biventer* were destroyed during an operation. Severe general ataxia followed, but disappeared from all parts excepting the right arm and slightly the right leg.

Epilepsy and Gun Shot Wounds of the Head.

WILLIAM ALDREN TURNER (*Journal of Neurology and Psychopathology*, February, 1923) writes that sufficient time has elapsed since the war to reveal the later effects of gun shot wounds of the head. The records of the Ministry of Pensions (Great Britain) show that out of eighteen thousand men who received gun shot wounds of the head, eight hundred or rather less than 5% have become epileptic. The percentage would probably be higher if minor epilepsy and epileptic equivalents of a vertiginous character were recognized and included. The cases may be divided into two groups: (i.) those with a definite organic lesion of the skull, membranes and brain penetrating wounds; (ii.) those without injury to the skull (scalp and non-penetrating wounds). Focal or Jacksonian epilepsy is relatively uncommon; it occurs early and tends to disappear; while the generalized type is common by comparison, of later development and runs a chronic course. In nearly all cases some change is to be noted in the mental condition. The outlook in the majority of cases of generalized epilepsy is unsatisfactory and the results of surgical measures are not encouraging. In view of the thousands of gun shot wounds of the head without epilepsy it looks as if something more than local tissue alterations is responsible for the seizures and in Turner's opinion it is an inherited or inborn constitutional predisposition to nervous instability and epilepsy.

Viscero-Cutaneous Anæmic Zones.

TH. B. WERNOE (*Journal of Neurology and Psychopathology*, August, 1923) discusses the fact that visceral diseases are frequently accompanied by cutaneous hyperæsthesia. The writer claims to have found a more accurate method of obtaining results than by previously used tests. His method is merely to expose the patient and watch the effect of cold. This is to produce reflexly a mild ischæmia, most pronounced in a hyperalgesic area and from its relative pallor easily visible in a subdued light. By this method three thousand patients have been examined. The author has prepared charts showing the localization of the anæmic areas in patients suffering from disease of the lungs, alimentary tract, bile passages, prostate, uterus and cardio-vascular system. It is explained that the investigations apply to localization alone; they reveal nothing of the nature of the causative disease. The value of the method lies in its principle which is to observe the affected organ's sensibility, expressed by the viscero-cutaneous anæmic zones. Owing to the fact that it is objective the author claims that it surpasses all subjective methods.

Myoclonus and Amyloid Bodies in the Nerve Cells.

GONZALO R. LAFORA (*Revue Neurologique*, November, 1923) claims priority of discovery of amyloid bodies within the nerve cells in myoclonic conditions. He says that chemically they seem to have a constitution intermediate between amylaceous and hyaline. They may appear diffusely spread throughout the nervous system or be confined to a circumscribed region. The myoclonic syndrome seems to depend on the localization of changes in the strio-rubro-cerebellar or the thalamo-rubro-cerebellar tracts. The intracellular amyloid bodies are not fatigue-products of the myoclonic contractions.

Parasyphilis and Neurotropism.

A. SÉZARY (*Revue Neurologique*, November, 1923) considers that the hypothesis of the neurotropic virus does not explain so-called parasyphilis of the nervous system. Levaditi and Marie have merely demonstrated that the virus from the brain of a general paralytic has biological characters differing from those of chancre virus. They do not prove the neurotropism of the germ. The writer contends that the alterations of the virus as found in the brain are purely the result of the localization of the virus in the nervous system. The initial lesion in neurosyphilis seems to be parenchymatous and meningeal. Meningitis is a sign, not the cause of neurosyphilis.

Research.

THE MEDICAL RESEARCH COUNCIL.

THE annual report of the Medical Research Council for the year 1922-1923 is constructed on the same lines as the previous reports. To give a comprehensive account of the contents of this report would entail the liberation of more space than is available. In the following summary many details have been omitted, notwithstanding their importance.

The National Institute for Medical Research.

The National Institute for Medical Research is situated at Mount Vernon, Hampstead. It is divided into six departments. In the Department of Bio-Chemistry and Pharmacology, under the directorship of Dr. H. H. Dale, much work has been carried out on the production and therapeutic use of "Insulin," the preparation of the anti-diabetic hormone of the pancreas. Drs. Dale and Dudley paid a visit to Toronto and on their return in October, 1922, they presented a report on the results of their investigations and observations. Dr. Dudley published a paper on the chemistry of "Insulin," including an account of its purification by precipitation as a picrate and the conversion of the picrate into a hydrochloride. This process has been adopted in the preparation on a large scale of "Insulin" in England. Several other investigations have been undertaken in connexion with this preparation. These are chiefly studies on its action in the body. The Committee find that no synthesis of the different items of knowledge into a coherent theory is yet possible, although much information has been collected. In the introductory chapter it is pointed out that the production of "Insulin" as the practical outcome of patient work in the laboratories of different countries seems to have been long delayed. Forty years ago it was ascertained that the pancreas or part of it controlled the functions whose disorder manifests itself as diabetes. Eleven years ago Schäfer coined the term insulin for the hormone or active principle of those pancreatic cells that have this function. This reference is not made to belittle the achievement of the Toronto workers who actually succeeded in preparing an extract of pancreas capable of performing this function. Mention is made of the work of Burn in revealing an antagonism between extracts of the posterior lobe of the pituitary body and extracts of the insular cells of the pancreas. The antagonism between extracts of the insular cells of the pancreas and extracts of the suprarenal body has been shown to be a partial, indirect one.

In the same department Dr. Dale has carried out researches into the question of the anæsthetic properties of chemically pure ether. These researches have been repeated elsewhere and have been confirmed. It is now established that pure ether, devoid of all traces of ketones, ethylene and other impurities, possesses full anæsthetic properties. Some interesting work has been conducted by Dr. H. King on the synthesis of certain glyoxaline derivatives.

In the Department of Experimental Pathology, Bacteriology and Protistology, Dr. S. R. Douglas has devoted his attention to tuberculosis and especially to the nature and action of Dreyer's diaplyte vaccines. Douglas has claimed previously that acid-fastness of bacilli is associated with the digestibility and antigenic action of the bacilli. Gram-positive bacilli are feebly antigenic. Treatment with acetone does not remove the fatty or lipoid content of the bacterium which apparently inhibits its digestibility. Dreyer claims to have removed the inhibiting fatty or lipoidal substances by formolizing the bacilli and that the bacilli thus treated are digestible and of high antigenic value. Clinical trials as well as laboratory tests have been instituted by Douglas and many others and promising results seem to have been obtained. The Council is extremely cautious in refraining from all expressions of opinion. Special reports on this work are promised in the early future.

Some important new work on filter passing organisms by Dr. W. E. Gye is announced. Dr. P. Hartley has prepared a standard diphtheria antitoxin which will receive recognition in England. Similar work with tetanus antitoxin has been begun. Dr. C. Dobell has carried out some good work on amœbic, coccidia and spirochætes.

In the Department of Applied Physiology Dr. Leonard Hill has continued his researches on the kata-thermometer and on various problems connected with temperature and cooling power. Some points in connexion with irradiations from ultra-violet rays, with the forms of soluble phosphate compounds present in the blood and with the action of sunlight on the inorganic phosphates have been carefully investigated. Lastly Dr. Hill and Dr. Campbell have completed an inquiry into the composition of air in artificial pneumo-thorax in the treatment of pulmonary tuberculosis.

In the Department of Applied Optics, Mr. J. E. Barnard continues to contribute valuable information on problems connecting hygiene with optics. An improved method of preparing plates for the photography of the ultra-violet portion of the spectrum has been devised. In the Department of Statistics Dr. Brownlee has introduced some new formulæ, some of which puzzle the ordinary reader. However difficult it may be for the average man to understand the application of higher mathematics to hygiene, there can be no doubt of its great utility and accuracy. The mathematician only fails when the data brought to him from outside are unreliable. Of the sixth Department, the Library and Publications, little need be said in this place.

Biological Standards.

Progress is being made in setting up standards for drugs and reactions. The standard for arseno-benzol preparations has been adopted for all such preparations offered for sale in England. Work is being conducted in connexion with a standard for "Insulin" and as mentioned above for diphtheria antitoxin. In close connexion with this work is that of keeping the national collection of type cultures in a complete condition. Many additions have been made during the year. Standard cultures and standard sera have also been made.

The endeavour to standardize the sero-diagnosis of syphilis is being continued. This is part of the international scheme. The Health Committee of the League of Nations has set itself the task of establishing international standards for sera and serological methods. The desirability of such a movement is obvious. A comparison has been made of the results of the Wassermann test, of the flocculation test of Sachs and Georgi and of its modification, the Sigma test, of Dreyer and Ward. This work is necessarily slow, but progress has been registered in several directions during the year. Lastly some useful work has been carried out at Oxford in anthropometric methods and standards.

Research in Clinical Medicine.

The clinical units at University College Hospital, at Saint Bartholomew Hospital, at the London Hosptial, at Saint Thomas's Hospital and at Guy's Hospital in London, at the University and Royal Infirmary at Sheffield and at the University and the Royal Infirmary in Edinburgh have carried out a certain amount of deliberate research. Much important work has been carried out under the direction of Sir Thomas Lewis on cardio-vascular disorders. In this matter it is interesting to note that Dr. W. N. Horsfall, of Sydney, was a voluntary worker in the unit and contributed good work. Researches into the physiology of the liver in certain pathological states have been carried out by Dr. J. W. McNee, with whom Dr. C. H. Kellaway, of Melbourne, has been associated. This work is of importance and has attracted attention. At Saint Thomas's Hospital Dr. Hugh MacLean has devoted himself largely to the therapeutic uses of "Insulin."

An interesting innovation is recorded in the making of grants to private medical practitioners to facilitate research work in clinical or private practice.

Special Researches.

Seventy pages of the report are devoted to research in specific subjects. Much of this work has been planned by

special committees, while some of it has been undertaken simultaneously in several independent places. The following are some of the subjects attacked: Problems of child life, toxæmias of pregnancy, metabolism of infants, rickets, vitamins, dental diseases, disseminated sclerosis, tuberculosis, diphtheria, canine distemper, diabetes and treatment with "Insulin," radio-therapy, radiography, metabolism, immunity and certain problems in epidemiology and parasitology. Each of these subjects deserves separate treatment in some detail. This, however, must be deferred for the present. In the work on rickets some interesting investigations have been carried out in Glasgow under Dr. Leonard Findlay on the calcium values of the blood. Dr. J. B. D. Galbraith, of Melbourne, has published an important report. Professor Korenchevsky has continued his researches at the Lister Ihstitute on the relation of diet and the skeletal changes in rickets. Closely associated with this is the voluminous report on rickets in Vienna by Drs. H. Chick, Elsie Dalyell (of Sydney), E. M. Hume, H. M. M. Mackay, H. Henderson Smith, Hans Wimberger and M. Zarfl. The report by Surgeon-Commander S. F. Dudley on the Schick test and various aspects of the infection of diphtheria and scarlet fever has been discussed in these columns. A special investigation has been instituted into the nature of canine distemper and the behaviour of filtrable viruses has been rendered possible by the generosity of the London *Field* and the managers of the London *Daily Telegraph*. The work is being conducted by a committee with Sir William Leishman as first chairman and later with Dr. C. J. Martin as chairman. The work is of great importance and we anticipate that the labours of the committee will be rewarded in the revelation of many facts in connexion with this disease. The work of Sir Almroth Wright on his new principles in therapeutic inoculation demands careful attention and will be discussed in a separate article.

Industrial Medicine.

The remainder of the report is reserved for the record of researches into problems in industrial hygiene and industrial fatigue. Dr. J. S. Haldane's work on dust inhalation, Dr. T. L. Llewellyn's work on miners' nystagmus and Dr. Lucy Cripps' work on physical efficiency are important contributors to knowledge. In addition some highly useful investigations have been carried out on the physiology of muscular work by Messrs. H. Lupton and C. N. Long, by Dr. E. P. Cathcart, Dr. A. V. Hill and their co-workers, on industrial psychology by Miss M. Vernon and Miss Burnett, on the legibility of type, on illumination and on several other problems of industrial undertakings.

In the concluding chapter the Council announce with regret that Sir William Leishman and Professor Gowland Hopkins have retired from the Council on the completion of ten years of continuous service. There is now no member of the Council who was a member of the original Medical Research Committee of 1913.

Medical Societies.

THE SYDNEY HOSPITAL CLINICAL SOCIETY.

A MEETING OF THE SYDNEY HOSPITAL CLINICAL SOCIETY was held in the Lecture Hall, Sydney Hospital, on September 27, 1923, DR. T. FIASCHI, D.S.O., the PRESIDENT, in the chair.

Tuberculosis of Serous Membranes.

DR. J. MACDONALD GILL showed a middle aged man who had been admitted to hospital on account of swelling and pain in the right knee of some months' duration. The swelling had been fusiform, partly fluctuant and apparently due mainly to periarticular thickening. Examination by X-rays had failed to reveal any bony abnormality. While in hospital the patient had developed ascites and later on an effusion into the pleura. The fluid withdrawn from the pleura had been clear and had shown no special charateristics. The serum had failed to react to the Wassermann test. At the time of demonstration the man was pale and had lost weight. There was slight fever, but no other definite clinical signs were present. Dr. Gill pointed out that the condition of the knee closely resembled Charcot's disease. The subsequent occurrence of effusion into the serous cavities was in favour of tuberculosis. He proposed to submit the patient to the tuberculin test. Treatment was purely symptomatic.

Myasthenia Gravis.

DR. HAROLD RITCHIE showed a woman, aged forty-two years, who had been complaining of increasing weakness for some months. This had been most noticeable in the neck and jaw. The patient was very thin. She was unable to hold her head erect for more than a minute and had to support her chin on her hand. She had difficulty in keeping her mouth closed and the slightest pressure on the lower jaw sufficed to separate the teeth in spite of the patient's resistance. She could not keep her eyes open if a finger was laid on the upper eyelid. It was found that exertion caused rapid loss of power in the muscles of the body. The muscles of the limbs gave the reaction characteristic of *myasthenia gravis*. Dr. Ritchie said that the patient's condition was typical of *myasthenia gravis*, the muscles of the head and neck being affected much more than those of the trunk.

Generalized Scleroderma.

DR. HOLMES À COURT showed a woman suffering from generalized scleroderma. The notes of this case will be published in full in a subsequent issue.

Bony Spurs of the Os Calcis.

DR. GEORGE BELL, O.B.E., showed a man, aged fifty-eight years, in whom X-ray examination had revealed spurs springing from the posterior and superior aspect of each *os calcis*. Radiological examination had been undertaken on account of a fracture of the right leg. The patient had no symptoms referable to the spurs. They were about 0.6 centimetre (one quarter of an inch) long and 0.3 centimetre thick at the base. They ended in a sharp point. They were directed upwards and backwards and appeared to run in a parallel direction. It was suggested that such spurs were commonly associated with gonococcal infection of the periosteum. The patient denied having suffered from a gonococcal infection. The complement deviation test had not been performed. The spurs caused no disability and no treatment was considered necessary.

Sarcoma of the Index Finger.

DR. H. K. PORTER on behalf of DR. H. S. STACY showed a man, aged forty-five years, who had suffered from a swelling of the index finger for twenty years. During the previous two months the swelling had rapidly increased in size and at the time of demonstration was as large as a cricket ball. It was hard, bluish and covered in parts by dilated veins. Radiological examination had revealed an opaque, rounded swelling occupying the site of the metacarpal bone of the index finger. The bone was diffused throughout the swelling. The tumour was apparently a sarcoma of the bone. Dr. Stacy proposed to amputate the limb at the elbow joint, but before doing so would have an X-ray examination made for the purpose of discovering possible secondary deposits.

"Insulin" in Diabetes.

DR. G. C. WILLCOCKS, O.B.E., M.C., showed a man, aged nineteen years, who was suffering from *diabetes mellitus*. Symptoms had first appeared five months previously. The patient had been carefully dieted both before and since admission to hospital. He had, however, steadily lost weight and maintained a blood sugar percentage of 0.483 before meals and 0.891 after meals. There had also been abundant sugar and fatty acid in the urine. "Insulin" had been administered in doses of from six to sixty units *per diem*. His weight had increased by 6.3 kilograms (one stone) in six weeks. While receiving twenty units of "Insulin" a sugar had been maintained at about 0.1% half an hour day the urine had remained sugar free and the blood

before a meal and 0.25% after a meal. The maximum effect of "Insulin" had occurred at from four to five hours after an injection. The fatty acids in the urine had apparently not been lessened by "Insulin" treatment when a diet of twenty-eight grammes of carbo-hydrates, forty grammes of protein and ninety-seven grammes of fat had been allowed, but these bodies had disappeared on making the carbo-hydrate up to forty-three grammes and the fat up to one hundred and twenty-seven grammes. For some weeks there had been no apparent improvement in the patient's ability to deal with carbo-hydrates without "Insulin." Eventually, however, a definite improvement in carbo-hydrate tolerance had become evident. The dose of "Insulin" had been gradually reduced to ten units a day. Its administration had been finally discontinued and there had been no marked return of glycosuria though the blood sugar had remained above normal. Dr. Willcocks said that it remained to be seen whether the improvement would be maintained.

Skiagrams.

DR. J. G. EDWARDS showed skiagrams of a number of interesting conditions. These included an abscess of the lung; a sarcoma of a metacarpal bone in which was seen diffusion of the bone through the tumour with the absence of any definite outline in the affected phalanx; a fracture of the femur in which a vertical chip of bone was separated below the lesser trochanter without affection of the main shaft of the bone; syphilis of the bones of the skull; dilatation of the heart accompanying an acute infection and increased lung markings in a thin person with an exposure at a distance of one metre.

Lesion of the Skin.

DR. N. PAUL showed a patient who was suffering from *dermatitis herpetiformis* with arsenical pigmentation and hyperkeratosis. The patient was a young man, aged twenty-three years, who had been treated for some months with *liquor arsenicalis* in doses up to 0.6 cubic centimetre (ten minims) thrice daily. There was a diffuse mottled brownish pigmentation all over the body and more noticeable on the exposed surfaces. There was definite thickening of the palms of the hands and the lesions of *dermatitis hereptiformis* were evident mostly on the trunk and arms.

Pathological Specimens.

DR. GOLDSWORTHY on behalf of DR. WALTON SMITH showed some interesting pathological specimens. These included a tumour of the jaw, a plexiform neuroma of the hand, multiple tumours of bone and suprarenal rests in the ovary.

British Medical Association News.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

DARRAGH, WILLIAM CHANDLER, M.B., Ch.M., 1923 (Univ. Sydney), Lucy Street, Ashfield.

ELLIOTT-SMITH, MERVYN HARRIE, M.B., Ch.M., 1923 (Univ. Sydney), 39, Shellcove Road, Neutral Bay.

FURNER, CARL RUSSELL, M.B., Mast. Surg., 1920 (Univ. Sydney), Islington, Newcastle.

HALES, MARJORIE FRANCES, M.B., Ch.M., 1923 (Univ. Sydney), 24, Orlando Avenue, Cremorne.

HUGHES, THOMAS DIXON, M.B., Ch.M., 1922 (Univ. Sydney), Women's Hospital, Crown Street, Sydney.

PIRIE, JAMES MURRAY GORDON, M.B., Ch.M., 1923 (Univ. Sydney), Royal Alexandra Hospital for Children, Camperdown.

RANKIN, ROBERT LIONEL, M.B., Ch.M., 1923 (Univ. Sydney), Mater Misericordiæ Hospital, North Sydney.

TAYLOR, CHARLES MALCOLM, M.B., Mast. Surg., 1921 (Univ. Sydney), Dumbarton, Ashton Street, Waverley.

THOMPSON, JOSEPH GEORGE, M.B., Ch.M., 1923 (Univ. Sydney), 10, Macarthur Parade, Dulwich Hill.

WATSON, ALBERT LESLIE, M.B., Ch.M., 1923 (Univ. Sydney), Marrickville Hospital, Marrickville.

THE undermentioned has been elected a member of the Queensland Branch of the British Medical Association:

SHEEHY, MARGARET MARY MADELEINE, M.B., Ch.M., 1923 (Univ. Sydney), St. Vincent's Hospital, Toowoomba.

Public Health.

TASMANIA.

THE DIRECTOR OF PUBLIC HEALTH OF TASMANIA, DR. E. SYDNEY MORRIS, has presented the Annual Report of the Department of Public Health of Tasmania for the year ended December 31, 1922. In his introductory remarks the Director expresses satisfaction that the State remained free from "dangerous infectious disease" during the period covered by the report. The incidence of scarlet fever and diphtheria, however, was again very high and the latter disease was of a more virulent type than in the previous twelve months. He also refers to the bi-annual conference and class of instruction held during the year for local sanitary inspectors. He regards these as of considerable value in helping the inspectors to become acquainted with the latest methods employed in dealing with public health problems. Owing to the stress of work it was not found possible to finalize the amending Public Health Bill in time for the last session of Parliament. It was anticipated that the amending bill would be submitted in the next session.

Local Administration.

The time of the inspectors of the Department was taken up during the year by the work instituted during the previous year in regard to the prevention of the introduction of plague. For this reason it was not possible to carry out sanitary surveys in a large number of municipal districts. The services of officers were utilized for this purpose only when a problem such as the outbreak of an epidemic confronted the local authority. The Director expresses his pleasure at recording that the number of unqualified sanitary inspectors throughout the island is gradually being reduced. At the examination of the Royal Sanitary Institute three of these officials obtained the certificate of inspector of nuisances. He rightly lays stress on the importance of adequate training of inspectors and looks forward to the time when every inspector will be a thoroughly qualified man with a complete knowledge of up-to-date requirements.

Notifiable Infectious Diseases.

Bubonic Plague.

The precautions taken during the year to prevent the introduction of plague were entirely successful and the State escaped infection.

Diphtheria.

The number of cases of diphtheria notified during the year was sixteen hundred and eighteen. This is distinctly less than the number for the previous year, which was two thousand and fifty-five. The Director says that the high incidence is a matter of grave concern. The number of deaths was fifty-eight, or 2.6 per ten thousand of population. The rate for the previous year was 2.9. The case mortality was 3.6%; for the previous year it was 3%. The high incidence is stated as being largely due to the lack of control of contacts, particularly in country districts. In the report of the previous year the reason stated was the fact that any serious throat trouble was

often regarded as being due to diphtheria. In this connexion it is interesting to note that the number of swabbings examined at the bacteriological laboratory of the Department of Public Health was 18,821. Diphtheria bacilli were discovered in 2,291 instances. During the year a pamphlet was issued from the Department and broadcasted throughout the State in order to bring under the notice of the people the early symptoms of the disease and the measures which are necessary in the event of the occurrence of a suspected case. Bush nurses in isolated districts were supplied with antitoxin and instructed to give an injection as "first aid" to a person suspected of suffering from the disease. They were also instructed to inoculate contacts, especially those under the age of sixteen years. In regard to the use of the Schick test and active immunization, the Director states that it will be a heavy task to mould public opinion in regard to the advantages of the method. He expresses the pious hope that as a result of his representations to the local authorities of the advantages to be gained from their use they will be universally adopted. It is cheaper to immunize children than to provide beds for the treatment of diphtheritic patients in infectious diseases hospitals.

Scarlet Fever.

The number of cases of scarlet fever notified during the year was nine hundred and eighty-one as against five hundred and ninety-eight in the previous year. The increase was so great that it was necessary to establish a special hospital to cope with the situation. The type of disease was mild and the case mortality was 0.9%.

Pulmonary Tuberculosis.

The number of cases notified during the year was one hundred and seventy-three. The Director evidently doubts the accuracy of this number, for he states that "if correct" the numbers show an appreciable decrease on those of the previous year. The number in the latter instance was two hundred and forty. He states that particulars of deaths supplied by the Statistical Department sometimes reveal the names of persons who have not been notified as suffering from the disease. He emphasizes the importance both from the point of view of the patient and those in contact with him of early treatment. He adds that home environment is not conducive to the well-being of the patient and that institutional treatment is available on application to the authorities concerned both for those suffering from the disease in an early stage and those affected by its later manifestations. The number of deaths from pulmonary tuberculosis in Tasmania during 1922, according to the Commonwealth Statistician, was one hundred and three.

Typhoid Fever.

The situation in regard to typhoid fever is encouraging as far as the number of infections is concerned. The number notified during the year was one hundred and thirty-nine. For the previous twelve months the number was three hundred and five. The case mortality was 10.8% in 1922 as compared with 8.5% in 1921. Twenty-two districts were entirely free from typhoid and in thirteen others only one infection occurred. Forty-eight cases were notified in Hobart and ten of these were in unsewered areas.

Puerperal Fever.

Sixteen instances of puerperal fever were notified in 1922. The number in 1921 was twenty-two. The mortality was very high and represented 75% of those reported. The Director points out, however, that some practitioners have failed to notify cases. He promises to take action to enforce the law in this regard. Moreover, several fatal cases of septicæmia arising after miscarriage in the early months of pregnancy were recorded in death certificates as puerperal septicæmia. It is interesting to note that the Commonwealth Statistician gives the number of deaths from puerperal septicæmia in Tasmania for 1922 as one and the number of deaths from septicæmia, sapræmia and pyæmia as four.

Venereal Diseases.

The Director states that although the notifications of venereal disease for 1922 show a reduction of 25% in comparison with the figures for 1921, he would not like to say that the incidence of the diseases has modified to that extent. He also imparts the interesting information that with a view to initiating educational propaganda arrangements have been made to secure on loan from the English National Council for Combating Venereal Disease a film entitled "The Shadow." This film is designed to impress the observer with facts that should deter and reduce promiscuous vice. The Department is prepared to give an impetus in connexion with such propaganda, but cannot assume the whole responsibility. No suggestion is made as to who should carry on this sort of work when once started. There has been abundant proof that many women while under treatment at public hospitals have exposed themselves to re-infection. Unfortunately the law cannot be put into operation against these persons unless those whom they infect, come forward and notify the source of their infection. No information is given as to whether any such notifications have been made. The alternative to such notification is the segregation of infected individuals until they are free from infection. The limited accommodation available makes this impossible. The number of cases of venereal diseases notified during the year was three hundred and fifty-seven. Of these infections two hundred and seventy-one occurred in males and eighty-six in females. One hundred and ninety-nine males and fifty-two females were infected with gonorrhœa and fifty-four males and twenty-nine females were infected with primary syphilis.

Child Welfare and Infantile Mortality.

Child welfare work is taken seriously in Tasmania. The work done by the child welfare nurses in addition to routine duties comprises the giving of lecturettes, demonstrations and instructions to school girls, girl guides and others. They also arrange for the publication in the press of various details concerning child welfare. Nurses from Tasmania undergo courses of training in New South Wales or New Zealand and reference is made to the fact of the nurse-in-charge going to the latter place to take a "refresher course." The Director states that it is gratifying to be able to record a reduction in the infantile mortality for the year. The figures for 1922, with the exception of those for 1917, are the lowest on record for Tasmania. The infantile mortality for 1922 was 55.7 per thousand; for 1921 it was 78.4 per thousand. The reduction is considerable. It will be seen on looking into the figures that there has been a reduction in all the States of the Commonwealth. In 1921 the infantile mortality in Tasmania was the highest of all the States. In 1922 it still managed to hold its position. Western Australia filled the second place with an infantile mortality of 55.6 per thousand. The Director regards the low rate as a matter for congratulation. It is doubtful whether this really is so. The drop has been noticeable in all the States and is probably due, as he states, to the reduction in the number of deaths from gastro-enteritis. This reduction is probably occasioned by the cyclic variation that occurs in the incidence and virulence of those diseases. Tasmania still heads the list in infantile death rates.

The Hospitals Act.

The Director states that the Government intends considering the whole subject of hospital administration. He adds that it has been agreed that with certain necessary modifications the New Zealand system, if adopted, should produce most satisfactory results. He has been instructed to visit New Zealand in order to obtain first hand information and hopes to do so in the near future.

Midwives.

Two hundred and sixty-two midwives took out certificates entitling them to practice. This number is well up

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to that of previous years. Sporadic cases of unqualified practice continue to occur from time to time. It is the usual practice to warn offenders against the regulations in the first instance and to prosecute if the notice is disregarded. Unfortunately there is no information given in the report as to how many prosecutions were undertaken on this account. A supervisory nurse attached to the Department pays attention to this aspect during her visits to the country.

Food and Drugs.

The work of inspectors in connexion with the prevention of plague introduction interfered largely with the supervision they were able to give to the enforcement of the measures dealing with foods and drugs. Ninety-four samples of foods and drugs were purchased for analysis. Sixteen were found to be adulterated. Articles found to be adulterated included milk, butter, cream, tinned milk, lemon squash syrup, baking powder, soap, lime fruit cordial and hair dye. Prosecutions were undertaken in four instances. "A large number" of samples of milk were obtained and submitted for bacteriological examination. The result gave an indication of the dairies requiring inspectorial supervision. It was found as a result that the sanitary conditions in these diaries was improved and the bacterial content of samples taken at a latter date was lessened. Unfortunately this is all the information given in this regard. It would have been interesting if more details had been supplied both in regard to the organisms found and the number of them. It is satisfactory, however, to see that the bacteriological examination of milk is regarded as necessary. This is the only method of determining the purity or otherwise of a milk supply. It is not undertaken in some other States.

Bush Nursing.

The working of the bush nursing scheme is reported as being satisfactory. There are now eight centres in various parts of the State.

Bacteriological Laboratory.

The report of the Government Bacteriologist in an appendix to the report of the Director shows that a large amount of work has been carried out in this branch of the Department. The number of specimens examined totalled 21,172. The increase in bacteriological work was so great that the making of autogenous vaccines had to be discontinued. There is no mention of the examination of blood serum by the Wassermann test in the report of the Government Bacteriologist. Apparently serum has to be sent out of the State for examination, as was stated in the last report of the Director. The Director again refers to the fact that the control of the laboratory should be in the hands of a medical man. He has repeatedly pointed out that the present state of affairs is highly unsatisfactory. At the present a large portion of the work which could be done effectively by a well equipped laboratory staff is left untouched. As the Director put it so well last year, the ship is being spoilt for a halfpenny worth of tar. If the general public could be made to realize that they are not receiving proper treatment in this regard, a change might be effected. In the meantime the Director and his present staff are handicapped in their efforts to do their duty.

Medical Appointments.

DR. R. J. STEVENSON has been appointed as Quarantine Officer at Cape Thevenard, South Australia.

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DR. H. H. TURNBULL (B.M.A.) and DR. B. T. ZWAR (B.M.A.) have been appointed Members of the Police Medical Board in Victoria.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney	Australian Natives' Association Ashfield and District Friendly Societies' Dispensary Balmain United Friendly Society's Dispensary Friendly Society Lodges at Casino Leichhardt and Petersham Dispensary Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney Marrickville United Friendly Societies' Dispensary North Sydney United Friendly Societies People's Prudential Benefit Society Phœnix Mutual Provident Society
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited Mutual National Provident Club National Provident Association
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane	Brisbane United Friendly Society Institute Stannary Hills Hospital
SOUTH AUSTRALIA: Honorary Secretary, 12, North Terrace, Adelaide	Contract Practice Appointments at Renmark Contract Practice Appointments in South Australia
WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth	All Contract Practice Appointments in Western Australia
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington	Friendly Society Lodges, Wellington, New Zealand

Diary for the Month.

FEB. 27.—Central Western Medical Association, New South Wales: Annual Meeting.
FEB. 27.—Federal Committee of the British Medical Association in Australia: Meeting at Melbourne.
FEB. 28.—South Australian Branch, B.M.A.: Scientific Meeting.
MAR. 4.—New South Wales Branch, B.M.A.: Ethics Committee.
MAR. 5.—Victorian Branch, B.M.A.: Branch.
MAR. 7.—Queensland Branch, B.M.A.: Branch.
MAR. 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
MAR. 12.—Central Northern Medical Association, New South Wales: Clinical Meeting.
MAR. 12.—New South Wales Branch, B.M.A.: Last day for nominations of Candidates to Council.
MAR. 12.—Tasmanian Branch, B.M.A.: Branch.
MAR. 13.—Brisbane Hospital for Sick Children: Clinical Meeting.

Editorial Notices.

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